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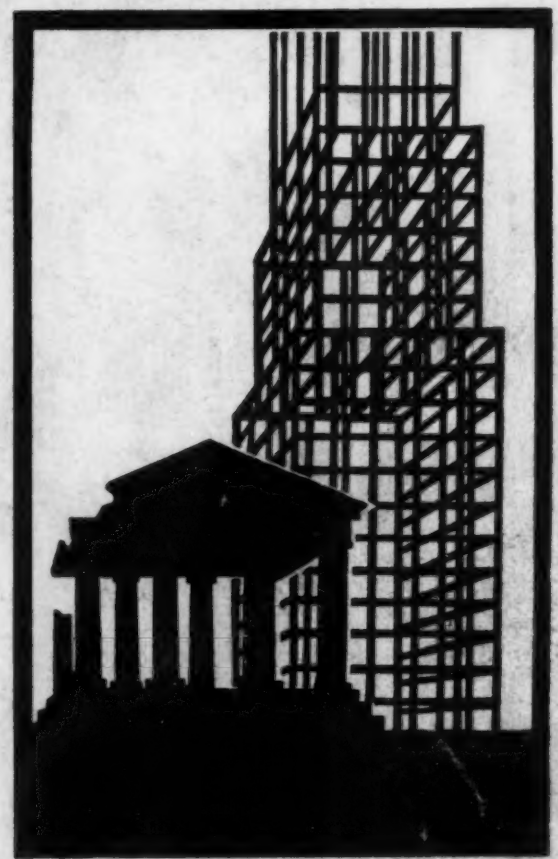
THE ARCHITECTURAL RECORD



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THE ARCHITECTURAL RECORD

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VOLUME 68 OCTOBER, 1930 NUMBER 4

ARTICLES PAGE

The Bushnell Memorial Building, Hartford Conn.
Corbett, Harrison and MacMurray, Architects 278–285

Can the Architect Promote More Business? *By Henry Wright* 288–290

How Architects May Cultivate Business *By A. Laurence Kocher* 290–292

Cases: How Architects Develop Business *By Robert L. Davison* 292

Architects' Insignia *By Victor Gifford* 309–311

An English Garden Village Silver End, Witham, Essex 312–317

Cubicles in Hospitals *By Cornelius S. Loder* 318–320

PLATES

The Bushnell Memorial Building, Hartford, Conn. *Frontispiece*

Portfolio of Banks

Bank of America, Bakersfield, Calif., Swasey and Hayne, Architects 293

Bank of America, Redlands, Calif., Swasey and Hayne, Architects 294

Portfolio of Banks *(Continued)* PAGE

National City Bank of New York, Walker and Gillette, Architects
34th Street and 7th Avenue, New York 298–302
Brooklyn, N. Y., Branch 295–297, 303
New York City Branch 303
Panama Branch 303
Buenos Aires Branch 303–305

Bank of Kalamazoo, Kalamazoo, Mich. Weary and Alford, Architects 306–308

The South Park Trade School, Beaumont, Texas, Livesay and Wiedemann, Architects and Engineers 286, 287

Designs by William Muschenheim, New York 321–326

TECHNICAL NEWS AND RESEARCH

Glass *By K. Lönberg-Holm* 327–358

BUILDING TRENDS AND OUTLOOK *By. L. Seth Schnitman* 359, 360

92, 94 *(adv.)*

PUBLISHER'S PAGES 85, 86 *(adv.)*

BOOK REVIEWS 96 *(adv.)*

NOTES IN BRIEF 98, 100, 102 *(adv.)*

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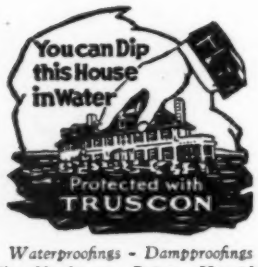

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Walker and Gillette: *New York architects specializing in banks, office buildings and country houses.*

Weary and Alford: *designers of banks and office buildings with offices in Chicago.*

Henry Wright: *city planner and a frequent contributor to* The Architectural Record.

CALENDAR OF EVENTS
GENERAL ANNOUNCEMENTS

October	The Department of Architecture of the University of New York will begin a series of lectures on "Promoting and Financing Building Projects."
October	International Hygienic Exhibition at Dresden, Germany. Buildings include a model hospital and a model housing project.
October-Nov. 15	"Man and Machines," an exhibit representing western industrial civilization, at Museums of the Peaceful Arts, 220 East 42nd Street, New York City.
Oct. 6	Exposition and demonstration of road construction equipment and materials, under auspices of American Road Builders' Association, Washington Auditorium, 19th Street and New York Avenue Northwest and demonstration field, Rock Creek and Potomac Parkway, Washington, D. C.
Oct. 7-10	Annual convention of the Illuminating Engineering Society. Hotel John Marshall, Richmond, Va.
Oct. 8-12	Sixth National Conference of Church Architecture, Cleveland, Ohio.
Oct. 30	Competition for designing bathrooms, sponsored by Standard Sanitary Manufacturing Co. Professional advisor, Howard K. Jones, firm of Alden, Harlow and Jones, 2103 Farmers Bank Bldg., Pittsburg.
Nov. 18-29	Art Exhibition, Royal Institute of British Architects, London (9, Conduit Street).
Dec. 1	Competition for "esthetic improvement" in design of water tanks, sponsored by Chicago Bridge and Iron Works. Albert M. Saxe, 430 N. Michigan Avenue, Chicago, architectural advisor.
Dec. 1-6	Ninth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York City.
April 18-25	Fourth Biennial Architectural and Allied Arts Exposition, Grand Central Palace, New York.

IN THIS ISSUE

HOW THE ARCHITECT MAY CULTIVATE BUSINESS

Meritorious service is the essential means of increasing practice. Knowledge of community needs and economic requirements and an established reputation based on satisfactory completed buildings bring clients to the architect. At the same time there are methods by which the architect can bring himself to the notice of prospective clients. These are outlined in this issue and illustrated by actual cases.

PORTFOLIO OF BANKS

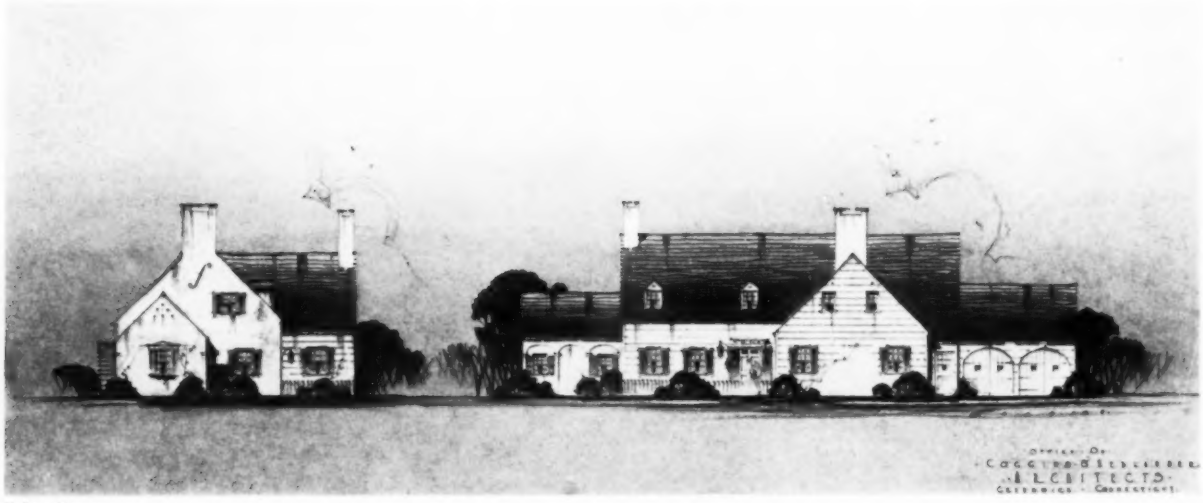
Banks have been selected for their suitability to the chain bank system. Branch banks illustrated show similarities in exterior treatment but with differences in plan.

TECHNICAL NEWS AND RESEARCH: GLASS

This study illustates the varied characteristics and physical properties of glass in its application to buildings and how glass may be used to best advantage on various types of construction. New glasses on the market, including ultra-violet ray glass, are discussed. Standards for judging relative merits of various glasses are set up.

BUILDING TRENDS AND OUTLOOK—NON-RESIDENTIAL BUILDING

This article by L. Seth Schnitman, statistician, continues the survey of building prospects for residential construction, presented in the September issue. In November Mr. Schnitman will discuss economic conditions within the engineering branch of the construction industry in relation to residential and non-residential building. Charts of material price trends are included.



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GREENWICH, CONN. • COGGINS AND HEDLINGER, ARCHITECTS

November issue—

THE COUNTRY HOUSE

New trends in country house work are surveyed in an article by Howard T. Fisher, who has been devoting his time to an investigation of requirements for this type of building. His study takes up such problems as heating and air conditioning, and the advantages and disadvantages of various heating systems and fuels; roof terraces and gardens, and methods of waterproofing, surfacing, and insulation; window sizes, and the proper orientation of rooms for sunlight and summer breezes. A check list of requirements is included.

This issue will consist largely of photographs of country houses together with working drawings, plans and brief descriptions. Selections have been made of houses which illustrate the most recent developments in all styles of domestic architecture as well as in all sections of the country. Many new features in design, planning and construction are shown.

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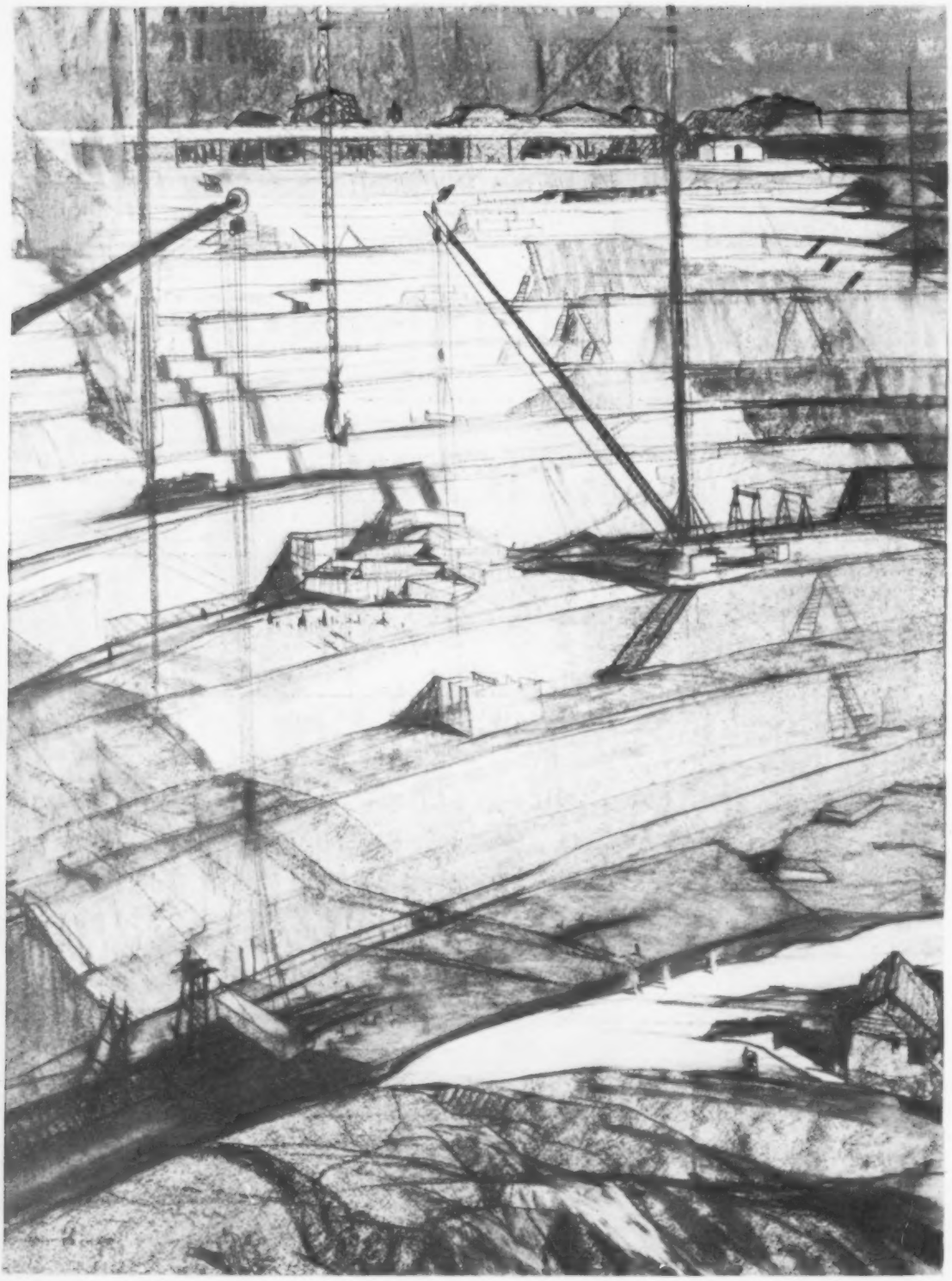

A QUARRY VIEW

This is number one of a series of twelve Drawings made at the Fletcher Quarries by Ernest Born.

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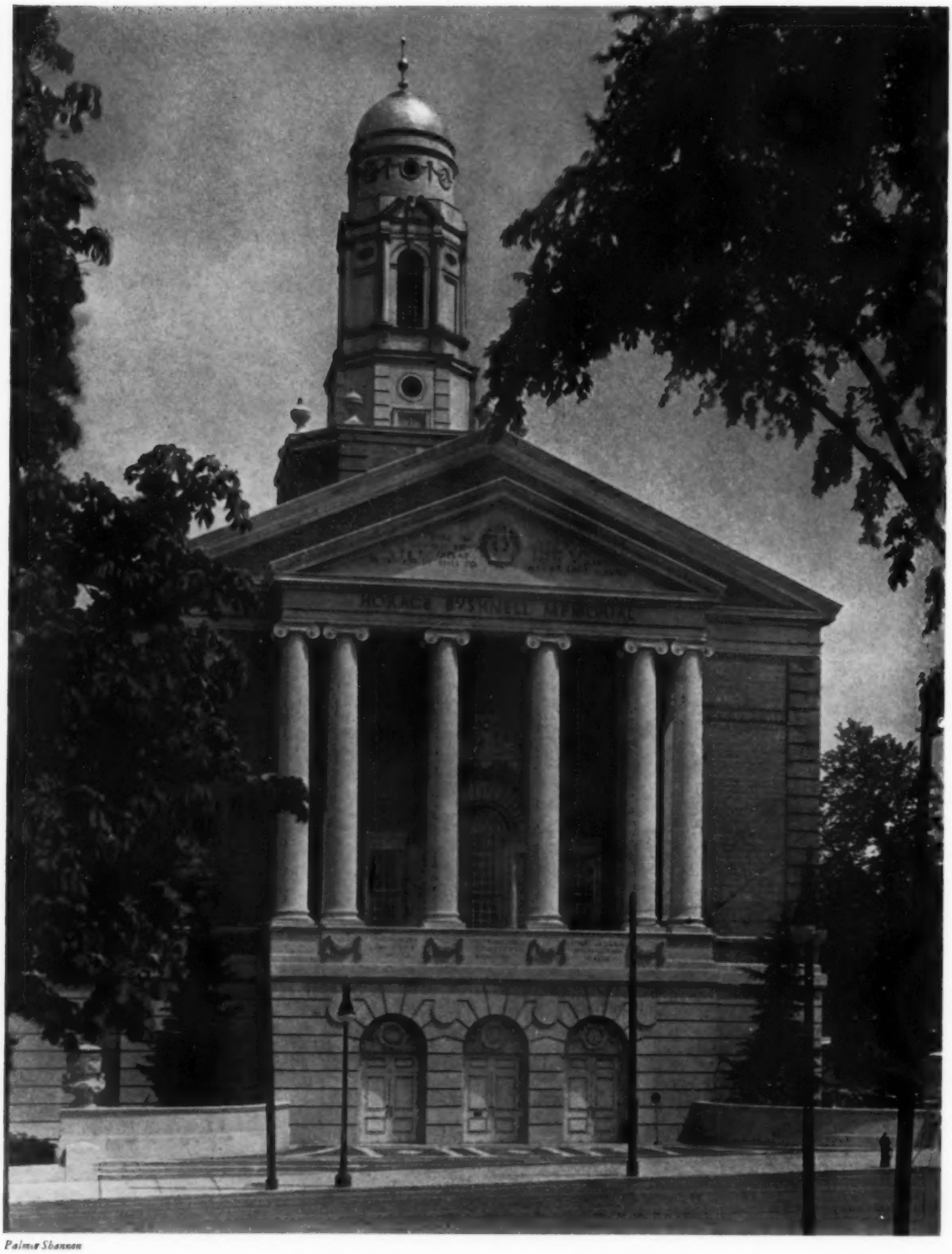

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BUSHNELL MEMORIAL BUILDING
HARTFORD, CONN.
CORBETT, HARRISON AND MACMURRAY, ARCHITECTS

THE ARCHITECTURAL RECORD

AN ILLUSTRATED MONTHLY MAGAZINE OF
ARCHITECTURE & THE ALLIED
ARTS & CRAFTS

VOLUME 68 OCTOBER • 1930 NUMBER 4

THE BUSHNELL MEMORIAL BUILDING

HARTFORD, CONN.

CORBETT, HARRISON AND MacMURRAY, ARCHITECTS

The building is a memorial to Horace Bushnell, a leader in civic affairs and one of the main figures in the life of Hartford during the middle of the nineteenth century.

Fronting the building is a large park which Bushnell, by his political and personal efforts, obtained for Hartford, and which has been named for him. In it stands the State Capitol.

•

PURPOSE

The auditorium, with a seating capacity of 3500, was planned to give a place of assemblage large enough to accommodate the occasional visits of the New York Metropolitan Opera Company, the Philharmonic or the Philadelphia Orchestra.

•

COST

The building cost $.65 a cubic foot.

•

EXTERIOR

The local architecture of New England was selected, which it was thought by the architects would conform with other buildings in Hartford and also with the clients' desire to have the style symbolize the life of their father and grandfather.

Brick and buff Indiana limestone are used for the exterior. The roof is copper.

The tower is used for the specific purpose of holding the fire water tank which had to be 20 feet above the highest point of the stage.

•

INTERIOR

The vast size of the auditorium made impossible the same scale and type of architecture as the exterior design. An entirely different style treatment but in keeping with the classical precedents was attempted. The difficulties of the problem can be realized by comparing the space enclosed by the auditorium with the largest room developed by the Colonial builders. Even the memorial room on the second floor of this building, which is comparatively small, is larger than any room built in this country during the Colonial period.

The auditorium provides the necessary mechanical equipment and acoustical effects. Perforated panels give sound absorption.

•

COLOR SCHEME

In the auditorium the lighting is designed so that it can be changed to any color in the spectrum. The walls were therefore kept a neutral French gray and the ceiling painting was done in black, white, gray and gold. The seats and hangings are magenta red, selected by experiments under special lighting conditions.

The memorial room is in natural color with the ceiling slightly tinted.

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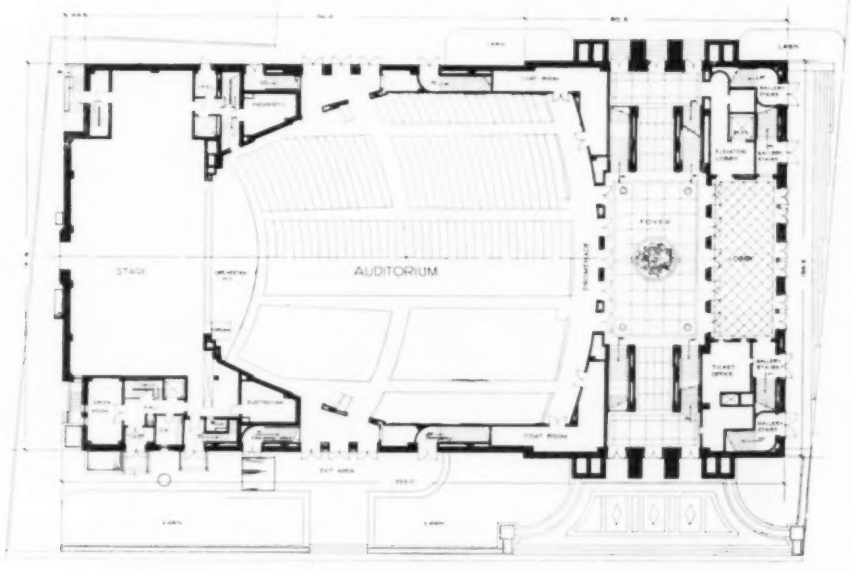
BUSHNELL MEMORIAL BUILDING
HARTFORD, CONN.
CORBETT, HARRISON AND MACMURRAY, ARCHITECTS



GROUND PLAN

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BUSHNELL MEMORIAL BUILDING
HARTFORD, CONN.
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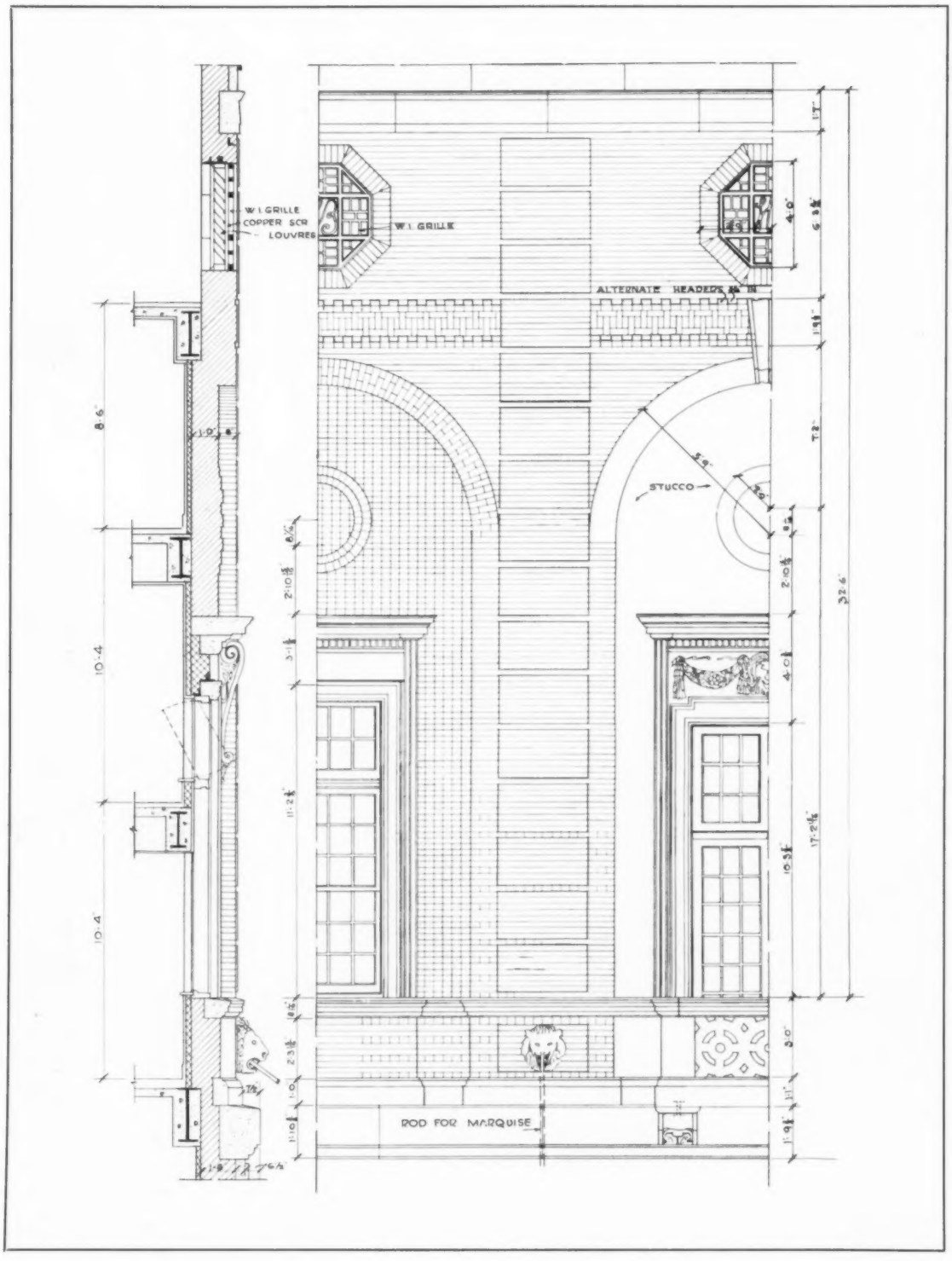

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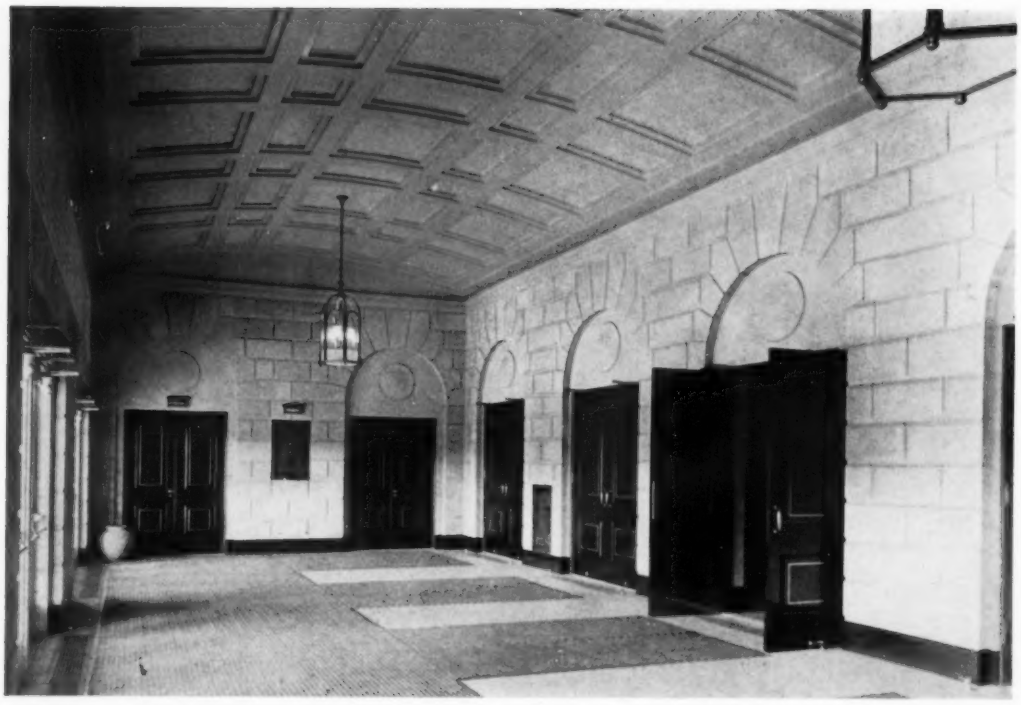

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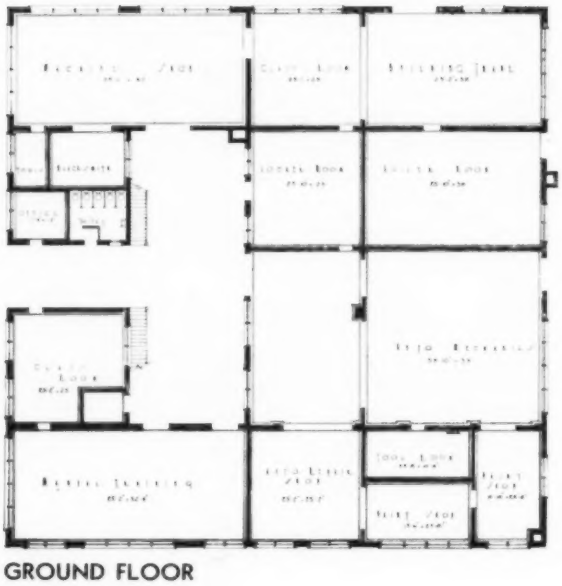
HARTFORD, CONN.
CORBETT, HARRISON AND MAC MURRAY, ARCHITECTS

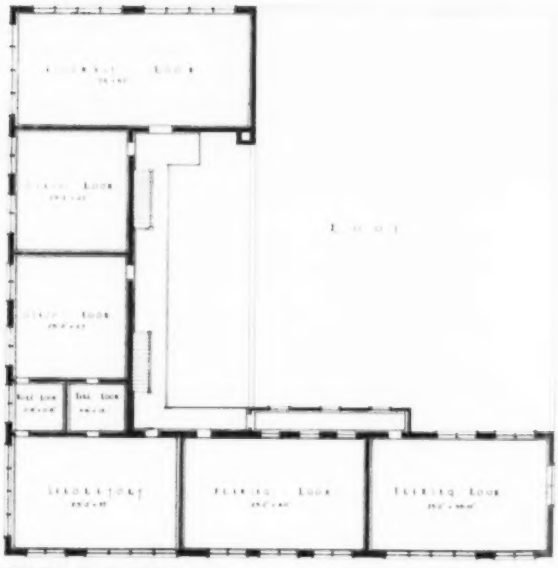
THE SOUTH PARK TRADE SCHOOL
BEAUMONT, TEXAS

LIVESAY AND WIEDEMANN, ARCHITECTS AND ENGINEERS

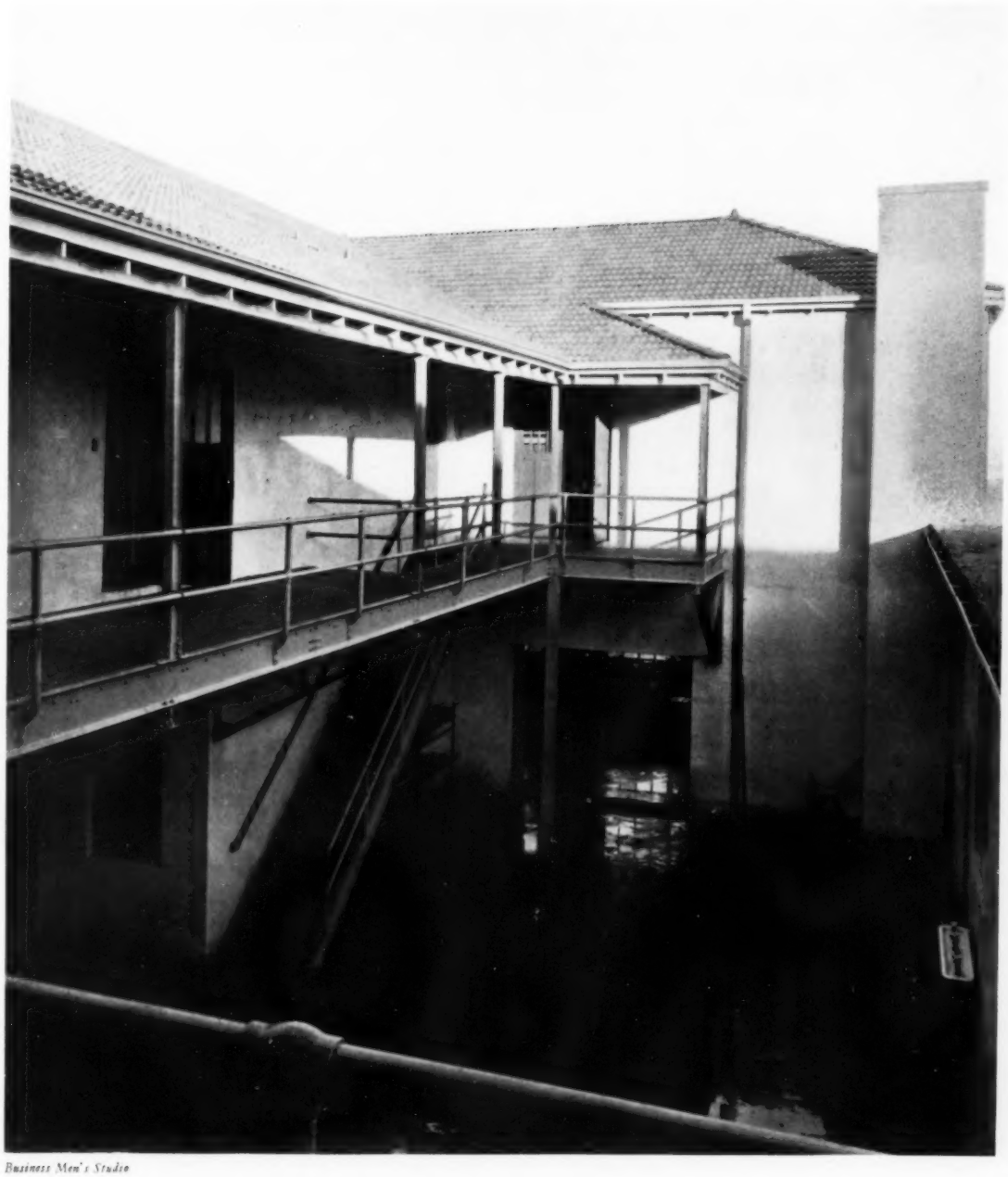
Business Men's Studio



GROUND FLOOR



SECOND FLOOR



Business Men's Studio

SOUTH PARK TRADE SCHOOL, BEAUMONT, TEXAS

LIVESAY AND WIEDEMANN, ARCHITECTS AND ENGINEERS

The school provides facilities for 400 trade students including sixth and seventh grade pupils of a neighboring school who are taking prevocational shopwork. The building has no basement. Shop facilities are on first floor, academic and drafting rooms and laboratories are on the second floor. The large expanse of factory window sash gives exceptionally fine light and ventilation.

A wide entrance gives access to courtyard, stairs and shop, and through it automobiles and delivery trucks can go to the repair and auto mechanics shop. Each main shop has accessories rooms for tools and materials. An assembly room on the second floor, 25′ x 32′, is sufficient for ordinary assembly purposes. Cost of building was $86,659, or 16c a cubic foot.

CAN THE ARCHITECT PROMOTE MORE BUSINESS?

With each recurrent dip in the economic curve, the architect is reminded of the rather slender footing upon which rests the foundation of his service outlet. A well-maintained office of today requires a more or less constant volume of work merely to meet the *overhead*. When the second city of the land recently touched the "low" of $500,000 in total building permits for one of the spring months, we could picture only inadequately the situation in a dozen large architectural offices whose combined overhead must exceed considerably the utmost commissions to be squeezed from such a paltry market. The attention of the profession may well turn from that mass of gratuitous advice of how the architect is to capture for his individual practice the cream of the current business to the question of how to get any business at all. He realizes afresh that his services are dependent largely upon projects promoted by others. Not only does he find himself at a loss to understand or influence the clogged wheels of progress, but in the reduced building market his services are likely to be curtailed as one of the unessential frills which must be dispensed with under the pressure of economic conditions.

Is architecture a luxury or a necessity? If it is unfortunately, and at times unreasonably, classed as the former, to what extent is the architect to blame and what can he do about it? Is he either practically or temperamentally fitted to engage in business promotion? Such promotion, if undertaken, is two-fold: first, in promoting a greater appreciation of his services in a larger part of building work actually carried forward; second, in helping to promote a larger volume of building particularly in slack times such as the present. Both purposes however, are strikingly linked together in actual practice. In order to promote a greater appreciation of architectural service many suggestions have been offered. It is ethically more appropriate and perhaps more effective for architects to proceed as a group or local chapter rather than as individuals, although it will be frankly admitted that the ripening fruits of such promotion are to be gathered individually by social contact with those who represent the credit necessary to float new projects. This popular cause has been neatly paraphrased in the slogan, "Make the Public more Architect-Minded"! The second and more important phase of promotion is the increase of volume of new building. Should architects individually or *en masse* directly undertake to engage in stimulating new construction?

Unquestionably a large amount of promotional work has been done during the recent years of plenty. An examination of the results, however, will reveal that a considerable percentage of this promotion has taken place with little regard for either the actual needs of the various classes of buildings projected or the requirements of the regions to be served. Promotion highly actuated by the need of credit outlets for capital has left in its wake a trail of overbuilding—office and loft buildings here, "high class" apartments there, factories elsewhere.

If the architect had greater opportunity to promote, could he do any worse? Could he even do better? What are his inherent opportunities as an architect?

If we are to "Make the Public More Architect-Minded," it may be in order to suggest that we "Make the Architect More Public-Minded". In serving clients as individuals the architect has come to regard his practice, and with it the welfare of the public, as an essentially individualistic procedure. However, looking back to precedents of great architectural accomplishments (to which we have perhaps too long looked back for stylistic inspiration), do

we find these accomplished by individual initiative? Some perhaps, but for the most part they represent community action. Even where the will to create has been centered in the monarch or despot the building has been accomplished through mass belief that it was of value to more than the immediate generation.

Is the appeal to the individual home interest, on which so large a part of our recent promotional effort has been centered, the only "prime mover" on which modern progress can depend? Acquire a home and then realize the deficiencies if your environment has been the unfortunate experience of countless thousands during the past generation. Here is a single problem about which more muddled agitation has been taking place than perhaps any other. Not only is it large enough to occupy a considerable part of the thought of the profession, but it represents by far the largest block of normal building construction and probably the smallest percentage of architectural participation. Some advance may be shown by statistics over the past ten-year period, but does it yet represent more than a fraction of its possible importance to the architect or his possible contribution to the community?

In the recent announcement of a Washington conference on home building there is an indication of some appreciation of the importance of city planning and contingent factors, yet the emphasis has been centered largely on better financing. No one will deny the importance of credit in stimulating home building, but if credit is merely to add more rows of flimsy, monotonous houses to those unfortunate border communities, which remain to us from the great land booms of 1922–26, we could almost wish that such credit might be suppressed. Only one worse fate could be imagined, that new home-owning agitation may again be used as a cloak to open up more miles of unused vacant lots or sparsely populated wastes of cement sidewalks and rusting utility pipes of which we have acquired enough to satisfy even the most ardent expansionist. Here is a study in regional needs as well as in the changing habits and requirements of the normal family which might well occupy the enforced leisure of local groups in the profession and which, if intelligently directed, might bring forth concrete suggestions, which could be put into operation as a result of the projected conference.

There remains a third factor to the present dilemma. To what extent is standardization and the constantly increasing size of individual projects reducing the quantity of architectural service in relation to the volume of building? If, as it is claimed, one single building now under construction in New York City will furnish the total amount of new office space needed to meet one year's normal business growth, is this trend favorable to professional prosperity? Granted the inspiration and satisfaction in the fact of doing well a gigantic structure, does not this great pile, even with its lobby and significant bronzes, represent more uniformity than a dozen equally simple and effectively designed structures representing a corresponding total expenditure? This is suggested only as an abstract speculation, which, however, might lead the Institute through an active committee to discover over a period of years some of the economic principles which should underly the disposition of commercial structures in relation to eventual civic economics. We may safely take the chance that these will vary from the current deduction of minimum skyscraper sizes based upon the immediate relation of rentals to existing land prices in large cities. However, we may inquire to what extent the architect heedlessly falls into the general movement toward bigger and therefore "better" buildings. I have in mind a certain commission for the building of a large private school in which working plans were under way for a single main building containing a multitude of halls and stairways, when one of the designers suddenly had a "hunch" that a series of smaller units would be more economical and practicable. The result was

a far more satisfactory and interesting project fitted with much painstaking care into a difficult though effective site. The architects were required to perform a greatly increased amount of service in relation to the total expenditure, although the latter was probably less in actual dollars and certainly much less in relation to usage value in the conduct of the school than would have been the case if the building had been completed under the more stereotyped design. Although such services might not prove normally advantageous under minimum ethical charges, I leave to the reader the question to what extent the architect may profit over a period of years by contributing more generously not only to that side of planning which can be expressed in terms of design and specification, but also to that equally important field related to the basic needs of humanity in which he will scarcely duplicate the efforts of those engaged in the more usual channels of promotion.

HENRY WRIGHT

HOW ARCHITECTS MAY CULTIVATE BUSINESS

VALUE OF ARCHITECT MEASURED BY SERVICE

The cultivation of business for the architect resolves itself into a scientific study of what the architect can do. In many instances the failure of architects to attract new business is due to a lack of organization or insufficient consideration of the variety of services which an architect could and should render. Investigation will indicate that architects who are achieving an increase in business are the aggressive individuals who seek out their commissions. They investigate and develop new enterprises with all the energy and accuracy that modern business practice makes possible. They establish confidence by the success of their completed buildings—a success that is more often practical than esthetic. In the development of their projects they assure themselves and their clients that the venture is financially justified. They take a cue from the business man and the manufacturer and realize the value of exhaustive preliminary research study of the client's problems in the light of facts scientifically gathered.

MEASURING THE NEED FOR ARCHITECTURE

In order to render a wider and more general service the architect must thoroughly understand his locality, whether large or small and also the potential demand or necessity for new buildings and building enlargement.

STUDY OF COMMUNITY

Determine the potentialities for constructive improvement and consequently for commissions. Of even more importance, assume a leadership in shaping the community growth by informed acquaintance with all the factors that make for better city growth and improved planning and design of buildings.

It is imperative that the architect should undergo a period of educational preparation under the following items:

1. *Study the existing plan of his community.* He should acquaint himself with the latest practice in town planning abroad and in America. He should undertake the preparation of a scheme of town development.

2. *Study present and past building progress* in the locality and elsewhere so as to anticipate need for stores, offices, schools, churches, garages, civic improvements. He will find that a growing section gives promise of increasing building needs, while a section that is decreasing in population is ordinarily oversupplied and requires few improvements.

3. *Survey housing requirements* in order to determine housing needs or excess.

4. *Study population movements.*

5. *Survey labor and building materials costs.*

6. *Acquaint himself with transportation facilities and needs* in relation to city growth. The traffic problem, allied to transportation, is one of the most serious and important of problems confronting city governments; and there is no group of persons more concerned in the need for traffic improvement and its relation to building than architects.

7. *Study and endorse improved planning of houses and other buildings* for greater convenience and improved health.

8. *Study and endorse newer construction methods and new materials if better.*

SERVICES WHICH AN ARCHITECT SHOULD RENDER

1. Assume a leadership in civic affairs.

2. Sponsor zoning that will contribute to a systematic and balanced growth of the city.

3. Serve as advisory architect to community, to industry, banks, corporations and individuals.

4. Master requirements of all city, county and state ordinances as they apply to building, health and fire protection.

5. Prepare financial "set-ups" for clients to ensure security of building investment.

6. Prepare plans and specifications.

7. Make exhaustive investigation of the use of a site or development of plans to ascertain all possibilities for the utmost success of undertaking.

8. Supervise construction.

PROMOTION

Here are some of the methods in common use by architects in getting business:

1. *Influential social connections*, political friendships, financial interest (owning stock in corporation concerned in building).

2. *Firm prestige*, successful outstanding buildings.

3. *Direct solicitation.*

4. *Follow-up of former clients.* The successful accomplishment of buildings for clients may prepare the way for new projects, additions, or recommendation to other clients.

5. *Leads from real estate brokers.*

6. *Specialization.* Building up a reputation on a type of building such as schools, churches, residences, hotels, loft buildings. The leadership of such an architect will be based on experience, lower cost due to quantity of construction and shortcuts acquired by experience. It is easier to solicit and gain commissions on the basis of work done. Specialization makes for greater efficiency in layout.

There are disadvantages in specialization, such as fluctuation in demand for buildings of one type, resulting in costly lulls. Office force trained in one specialty will show less competency in a new field.

7. *Use of construction reports.* The announcements of new projects are sometimes made before an architect is selected and may by direct solicitation lead to commissions.

8. *Personal promotion of projects* in cooperation with others. Apartment houses, office buildings, residential subdivisions are sometimes developed and partly financed by architects.

9. *Advertising services of architects* in a locality. The primary purpose of cooperative advertising is to promote education of the public as to the value of the architects' services.

10. *Competitions.* The winning of competitions may mean recognition of ability and other jobs.

11. *Remodeling of abandoned or rundown properties*, with modernization of utilities and improvement of plans and exteriors.

12. *Group practice.* The unified efforts of architects have frequently been successful in acquiring school and public improvement projects. Architects have come to realize that the prosperity of the individual depends in a large measure on the prosperity and energy of the group.

13. *Restudy of abandoned schemes* with a

better solution or a more economical system of construction or finance.

14. *Sponsoring new buildings* in a community where investigation discovered the need for such buildings. The success of a type of building in a neighboring community has sometimes suggested the desirability of a similar building in the architect's locality.

A. Lawrence Kocher

CASES:

HOW ARCHITECTS DEVELOP BUSINESS

BUSINESS ANALYSIS

Example: *Shreve, Lamb and Harmon, architects.*

Success, according to this architectural firm, means proven ability not only to design and build but also to conceive and execute the entire project in a *profitable* manner.

Preliminary designs by this architectural firm are done on the typewriter as well as on the drafting board. The client's problems are ascertained and analyzed: value of property, preferences for certain types of office space in particular localities, probable rental value of floor space as determined by the owner or his rental agent, set-back requirements and similar factors are considered. Given the cost of the plot and the rental demanded, the architects analyze the ratio of floor space to plot area required to return the desired income, making due allowances for financing, initial vacancies, maintenance, et cetera.

The extent of this procedure is illustrated by Mr. Shreve's answers to questions asked by newspaper reporters as to what materials would be used for the exterior and where the entrance would be in the new Empire State building. In each instance Mr. Shreve replied that he did not know and bringing out a typewritten sheet with a column of figures, and remarked, "This is the design for the building."

This procedure of designing an income-producing building for office space, according to Mr. Shreve, has not always been the point of view of the architect. A sound analytical approach to any architectural problem is more important than specialization in any one type of architectural work, he believes. The technique applied to analyzing an office building can also be used in designing a school building, a library or a bank.

ALTERATIONS OR NEW BUILDING?

Example: *Robert D. Kohn, architect.*

It is essential for the architect, according to Mr. Kohn, to be able to reduce the cost of a new building to terms of yearly carrying or rental charges.

In the case of Macy's Department Store, the owners wanted a recently acquired building remodeled and connected with their existing store. Mr. Kohn made sketches and estimated the cost of doing this work. At the same time he prepared sketches and cost estimates for a new building. Both estimates were reduced to an annual carrying charge or rental basis and showed the owners that it would be possible for them to have a new building which would eliminate objectionable features, such as exposed sprinkler systems and differences in floor levels between the two buildings, for an additional yearly carrying charge of 60 cents a square foot. With the proposition submitted in this form the owners decided to construct the new building.

Mr. Kohn emphasizes the necessity of architects being able to estimate correctly the cost of a job so that the client will not be annoyed in meeting a final bill much higher than anticipated. A fairly accurate cost estimate can be prepared in cooperation with contractors and an allowance added for contingencies.

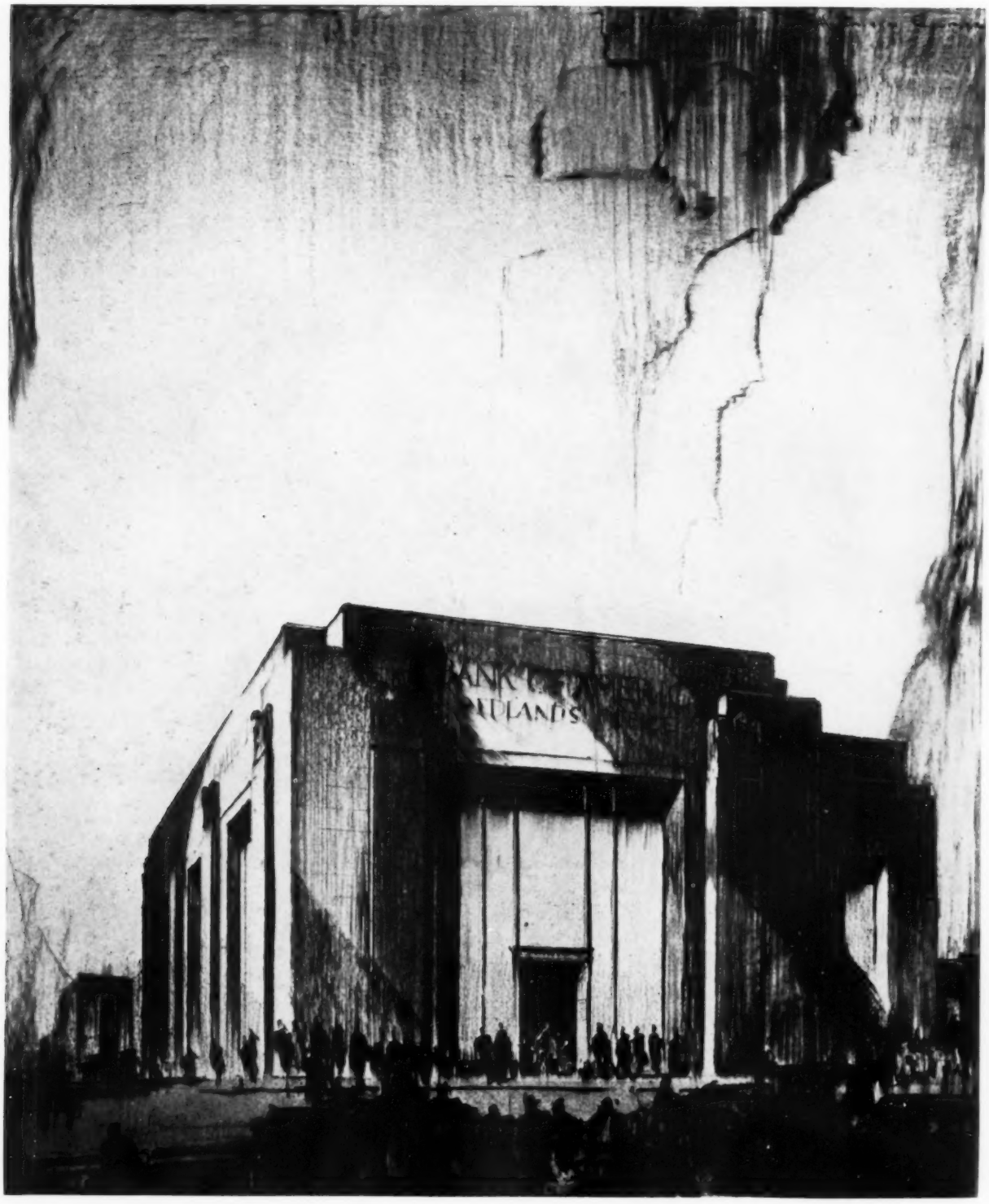
R. L. Davison

PORTFOLIO OF BANKS

BANK OF AMERICA
BAKERSFIELD, CALIF.
SWASEY AND HAYNE, ARCHITECTS

BRANCH BANKS

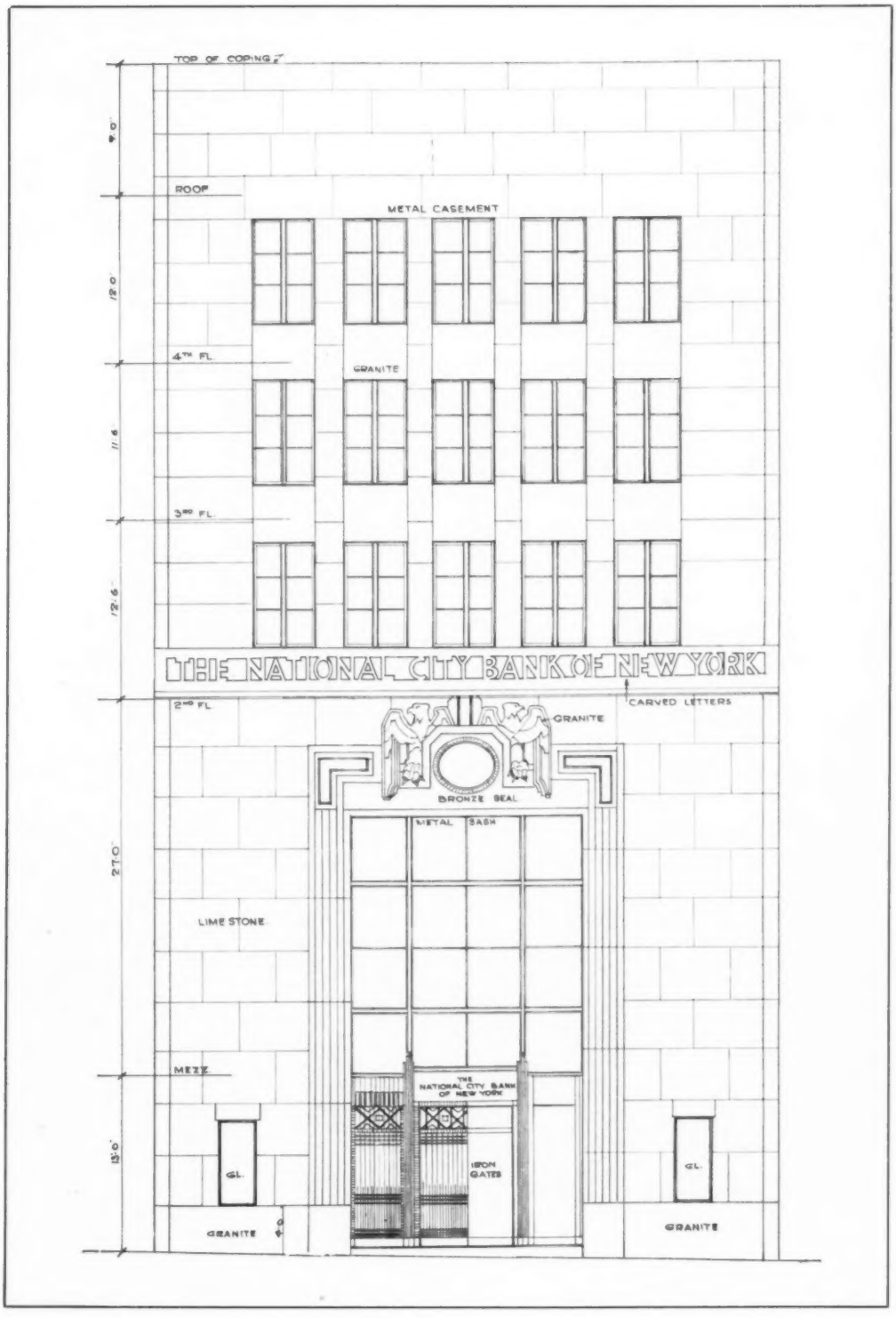
Examples of banks in this PORTFOLIO have been chosen for their suitability to the chain bank system. Similarities in treatment of exteriors, whether in this country or in Panama or South America, are readily apparent. Plans, however, differ for the different requirements of the branch banks.



BANK OF AMERICA
REDLANDS, CALIF.
SWASEY AND HAYNE, ARCHITECTS

Gillies

NATIONAL CITY BANK OF NEW YORK
BROOKLYN, N. Y.
WALKER AND GILLETTE, ARCHITECTS



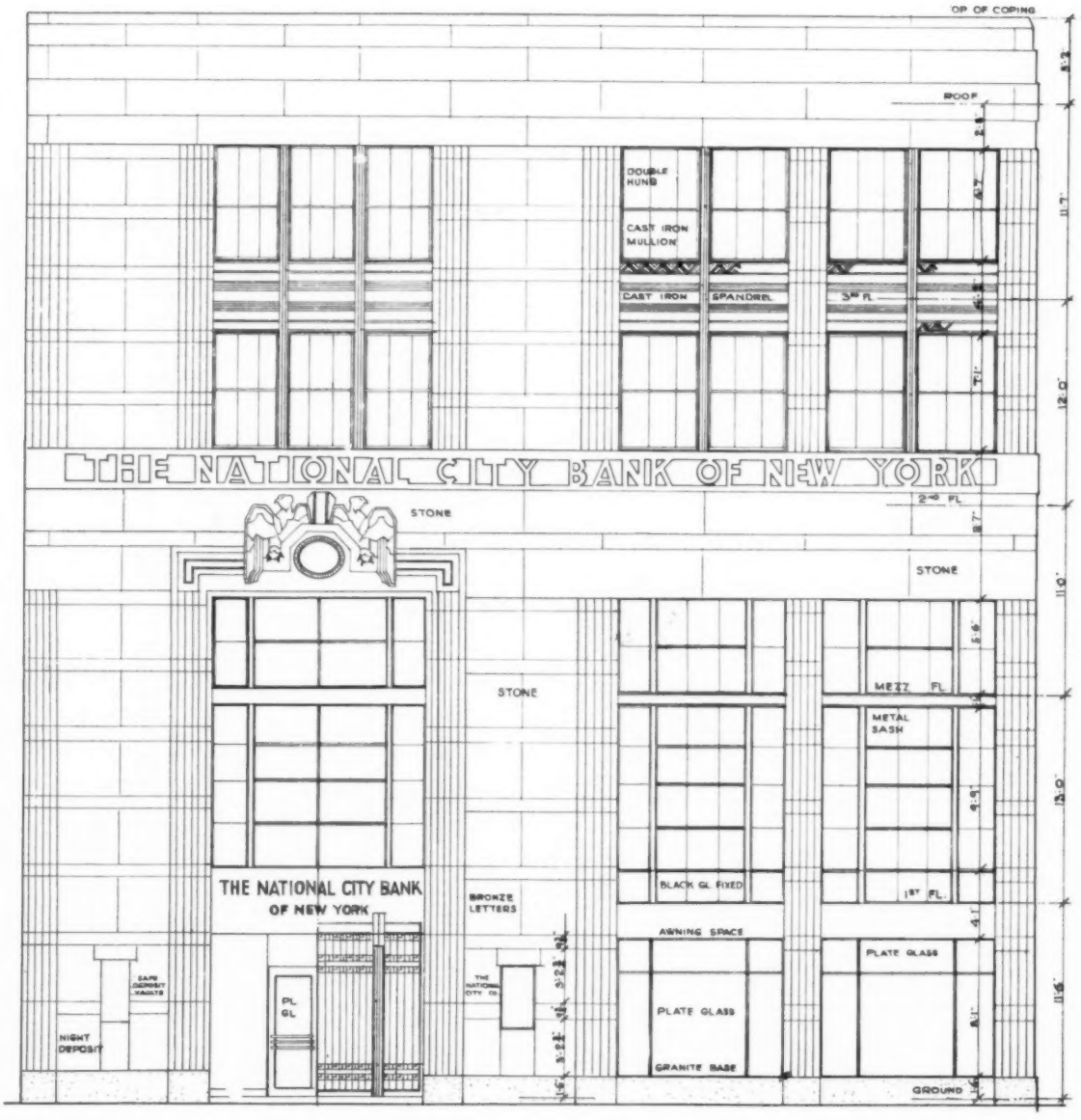
NATIONAL CITY BANK OF NEW YORK
BROOKLYN, N. Y.
WALKER AND GILLETTE, ARCHITECTS

Gillies

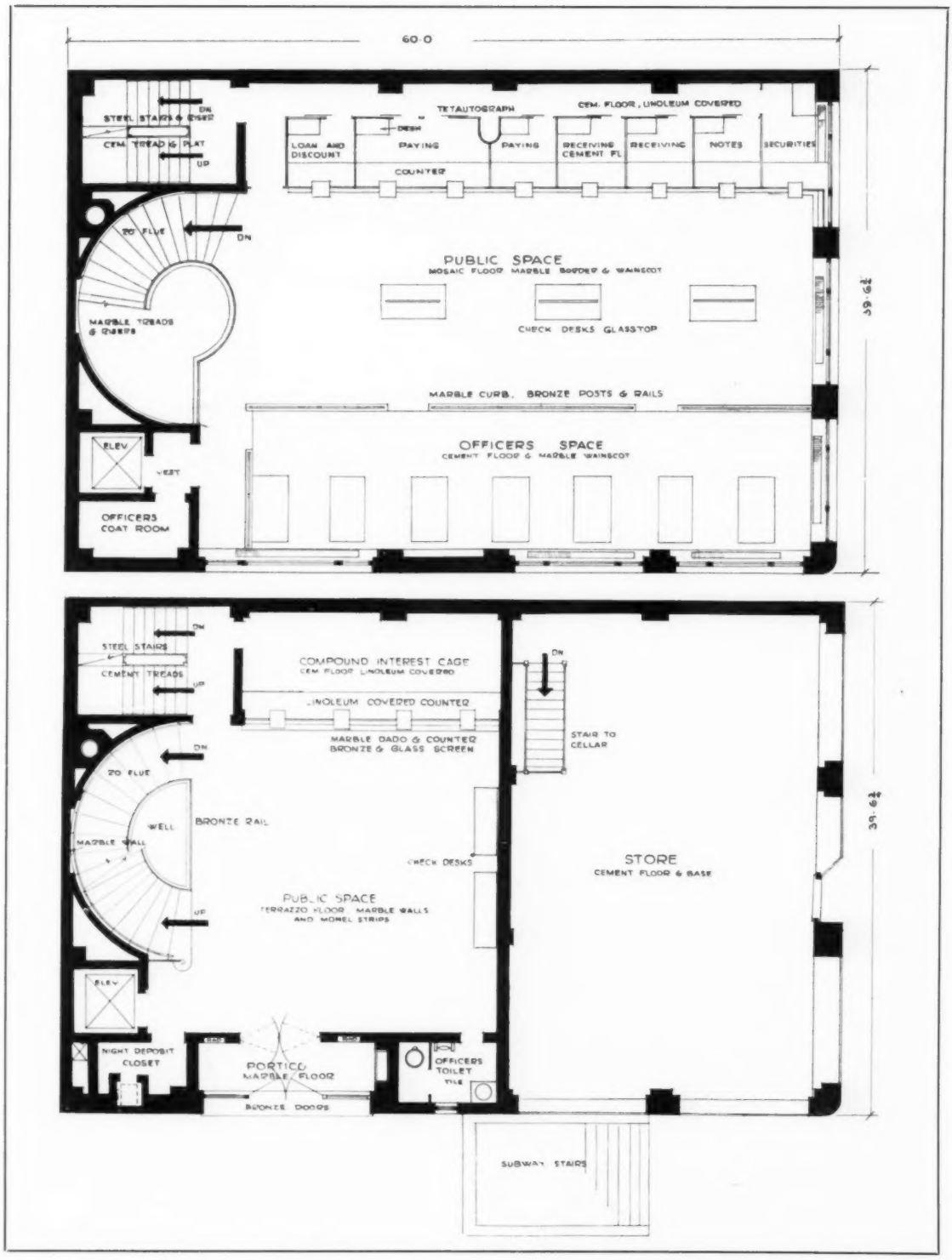
NATIONAL CITY BANK OF NEW YORK
BROOKLYN, N. Y.
WALKER AND GILLETTE, ARCHITECTS

ELEVATION DRAWING
34TH STREET FACADE

Bank occupies upper floors and only part of ground floor, the remainder of this space yielding additional rental from shops on 7th Avenue.



NATIONAL CITY BANK OF NEW YORK
34TH STREET AND 7TH AVENUE, NEW YORK
WALKER AND GILLETTE, ARCHITECTS



NATIONAL CITY BANK OF NEW YORK
34TH STREET AND 7TH AVENUE, NEW YORK
WALKER AND GILLETTE, ARCHITECTS

Gillies

NATIONAL CITY BANK OF NEW YORK
34TH STREET AND 7TH AVENUE, NEW YORK
WALKER AND GILLETTE, ARCHITECTS

Gillies

NATIONAL CITY BANK OF NEW YORK
34TH STREET AND 7TH AVENUE, NEW YORK
WALKER AND GILLETTE, ARCHITECTS

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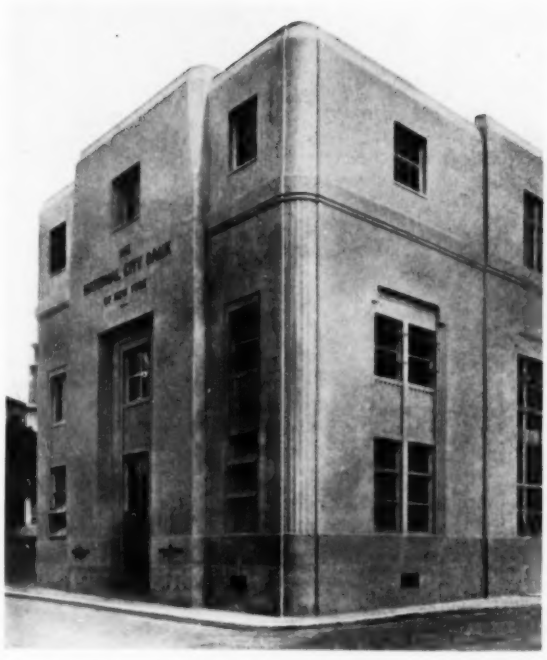
NATIONAL CITY BANK OF NEW YORK
34TH STREET AND 7TH AVENUE, NEW YORK
WALKER AND GILLETTE, ARCHITECTS



PANAMA BRANCH

BUENOS AIRES BRANCH

Gillies

BROOKLYN, N. Y., BRANCH

Fischer

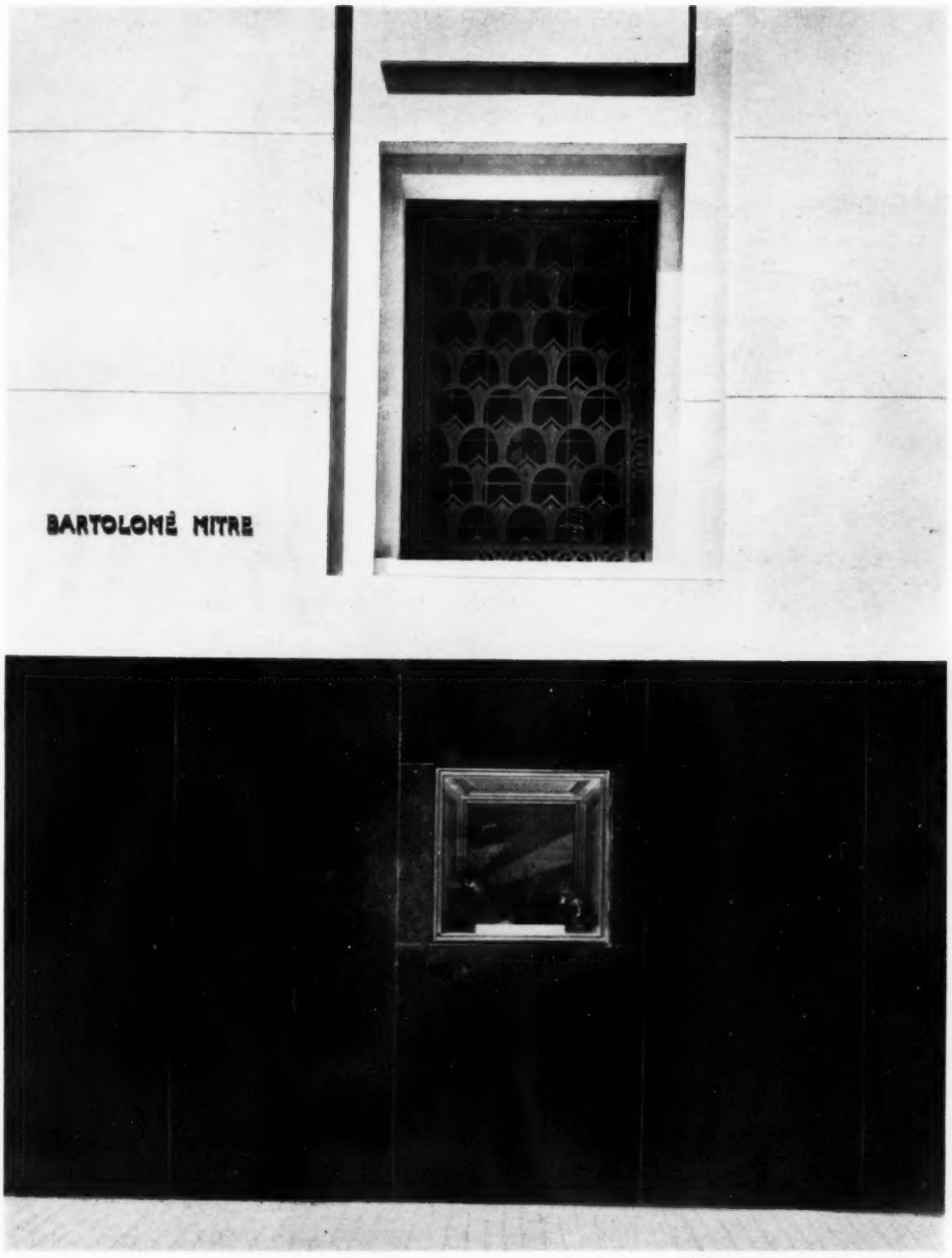
NEW YORK CITY BRANCH

NATIONAL CITY BANK OF NEW YORK
WALKER AND GILLETTE, ARCHITECTS

Main banking room

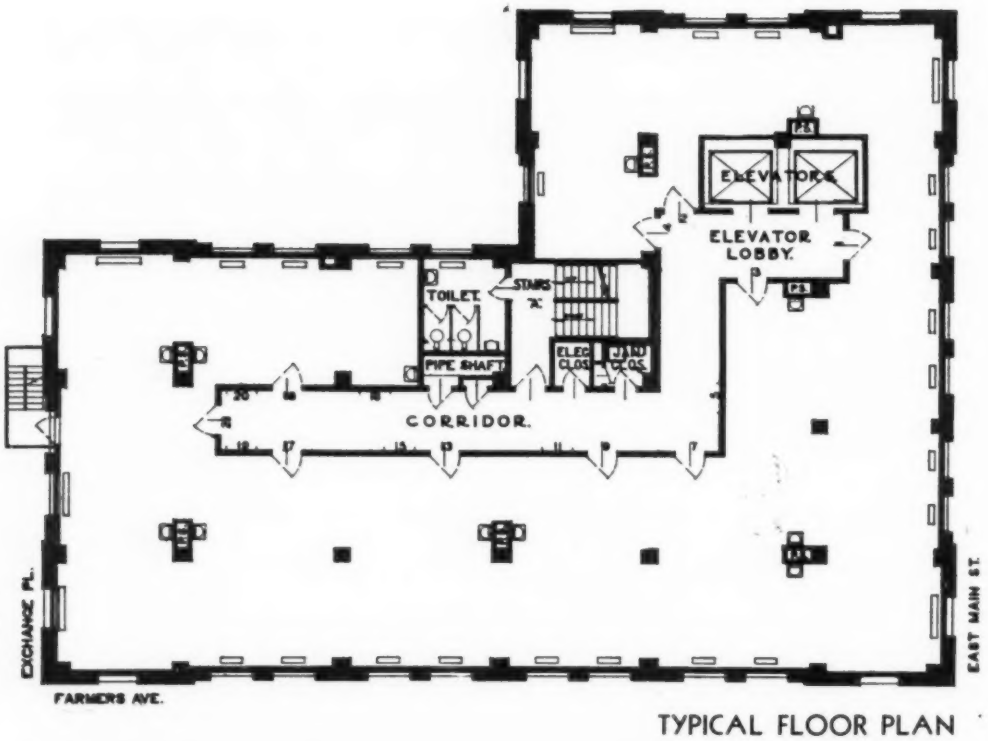
Foreign exchange window

NATIONAL CITY BANK OF NEW YORK
PANAMA BRANCH
WALKER AND GILLETTE, ARCHITECTS

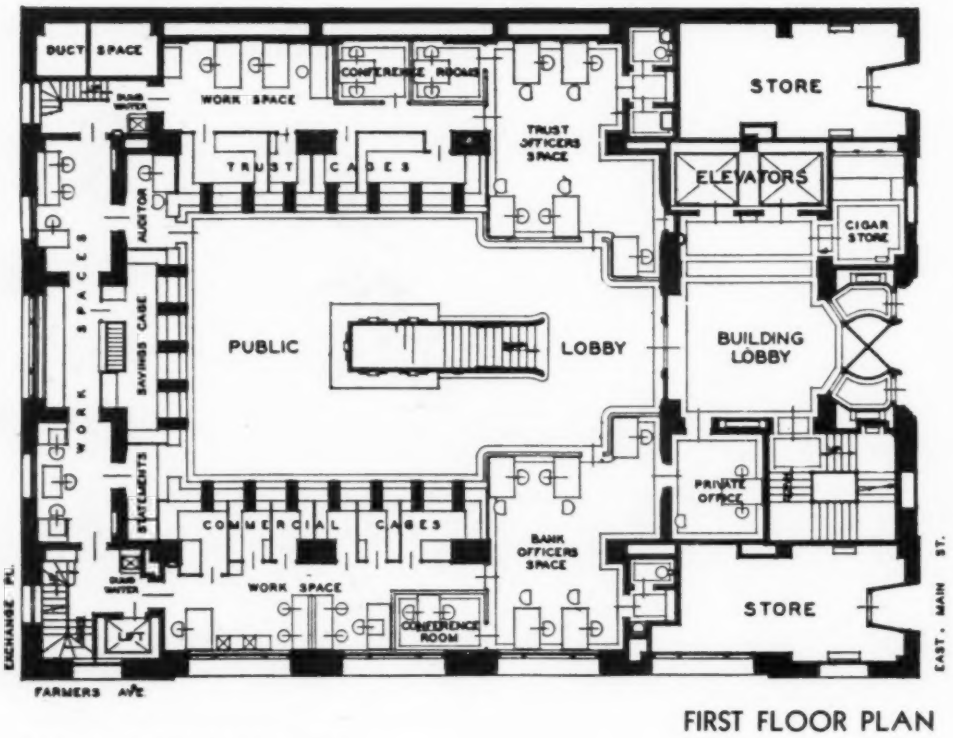


Advertising window on street

NATIONAL CITY BANK OF NEW YORK
PANAMA BRANCH
WALKER AND GILLETTE, ARCHITECTS



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN

BANK OF KALAMAZOO
KALAMAZOO, MICH.
WEARY AND ALFORD, ARCHITECTS

BANK OF KALAMAZOO
KALAMAZOO, MICH.
WEARY AND ALFORD, ARCHITECTS

BANK OF KALAMAZOO
KALAMAZOO, MICH.
WEARY AND ALFORD, ARCHITECTS

ARCHITECTS' INSIGNIA

By
VICTOR GIFFORD

DENNISON AND HIRONS

The plan titles of architects not only set the stamp of genuineness upon drawings, but they frequently disclose individuality of architect. Although titles in the form of cartouches are obviously an expensive flourish to the actual drawing, and necessitate additional drafting which otherwise might be spent to better advantage, nevertheless in many cases they embellish the drawing.

The title of Dennison and Hirons is of the classical order, having a cartouche flanked by two nude figures and surrounded by Louis XV scroll design. The initials comprise the center motif: two D's face each other with a horizontal bar running through the center, forming an H.

The plan label of McKim, Mead and White is of classical design, characteristic of the work of this firm of architects.

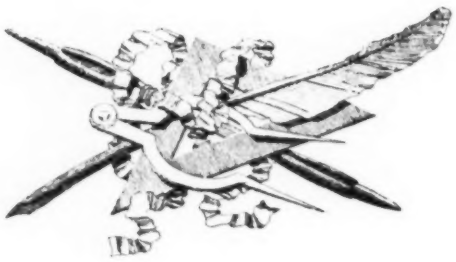
Architects do not confine themselves to one style of title design, as shown by the two examples by George B. Post and Sons.

The label of Leigh French, Jr., is very characteristic, the quill being symbolic of his ability as an author on architectural subjects and the dividers, pencil and triangle, all interwoven by a ribbon, showing his profession as an architect.

Cross and Cross, architects of the Barclay Hotel, designed a title for their exhibition drawing which the hotel later used on the linen and silver. The designer of the thistle emblem and scroll evidently had in mind the fact that the owner of the hotel was of Scotch ancestry.

The cartouche and ribboned title by the firm of Goodwillie and Moran shows a design with a center motif appropriate to the drawing it was to adorn, the R being the surname initial of the owner.

An interesting label, denoting the architectural profession, is that of the firm of Delano and Aldrich. A protractor very appropriately designates the letter D, and a pair of dividers an A.

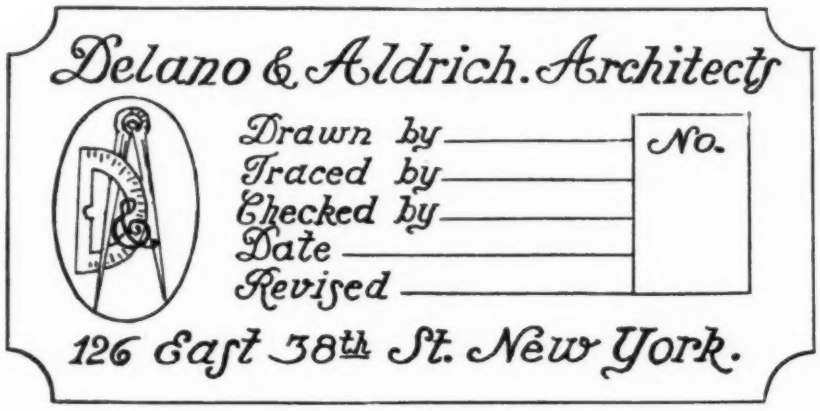


LEIGH FRENCH JR

CROSS AND CROSS
ARCHITECTS

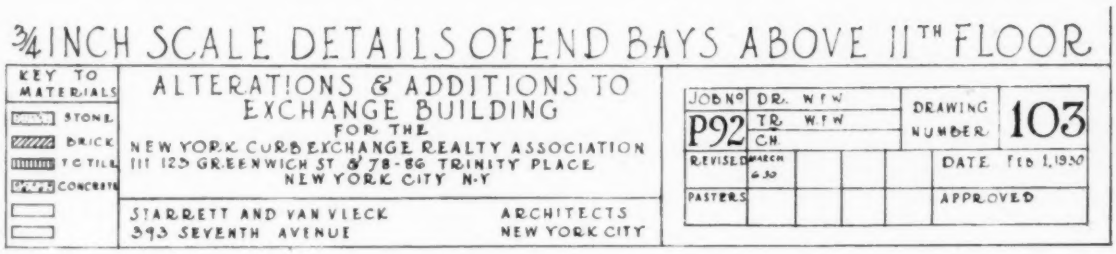
ARCHITECTS' INSIGNIA

GOODWILLIE AND MORAN
ARCHITECTS



Design for a stamp which saves time in drafting.

The present tendency is toward simplification in drafting. The cartouche type, although artistically presented, requires too much painstaking work and time, and is not as informative as the average working drawing label.



ARCHITECTS' INSIGNIA

AN ENGLISH GARDEN VILLAGE

SILVER END, WITHAM, ESSEX

In 1926, as the result of the acute housing shortage, the Crittall Manufacturing Company, Limited, began building operations for a garden village midway where employees could live within easy distance of their work.

For this project buildings were designed by Sir John Burnet and Partners, James Miller, C. Murray Hennell, C. H. D. Quennell, Joseph Clare and G. E. Clare, architects.

•

FIVE HOUSE TYPES AND COSTS

The village comprises 400 completed houses, all with large gardens and built no closer than ten to the acre. These houses can be broadly classified into five types:

Managers' houses, sold at prices ranging from $6,500 to $8,550;

Detached four-bedroom houses, $3,800;

Detached parlor houses, $3,400;

Parlor houses (containing parlor, kitchen, scullery, three bedrooms, and bath), from $2,100 to $2,600;

Non-parlor houses (containing three bedrooms), from $1,650 to $1,950.

The majority of these houses have been sold to the tenants on a 20-year purchase system, the weekly purchase rental being approximately $4 for the non-parlor type and $4.50 for the parlor type. This price includes water and ground rent.

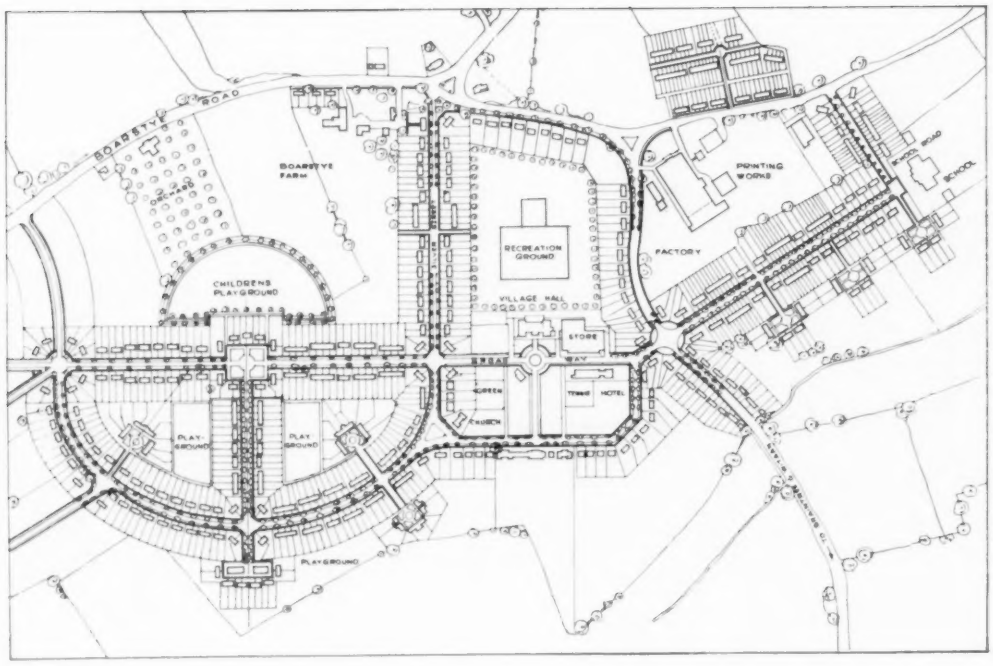
•

VILLAGE FEATURES

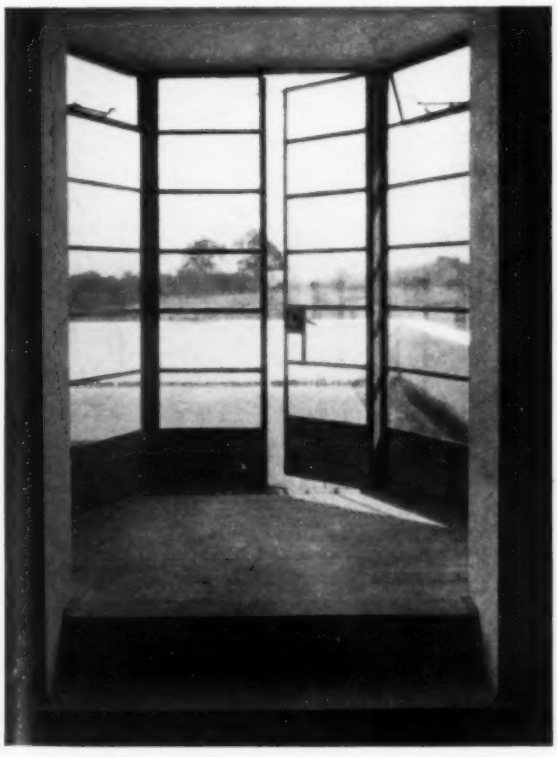
Since the beginning of the project additional surrounding lands have been purchased, forming an agricultural belt of approximately 700 acres where food is produced for the village.

In the center of the village is a large department store where the products of the village are sold to the inhabitants. This store serves for butchery, bakery, drapery, grocery provisions, furniture, drugs, outfitting, et cetera. There is also a fully licensed hotel with 16 bedrooms.

The village water supply is pumped in from a spring two miles away. A power station using oil engines supplies the village and factories with power and light.



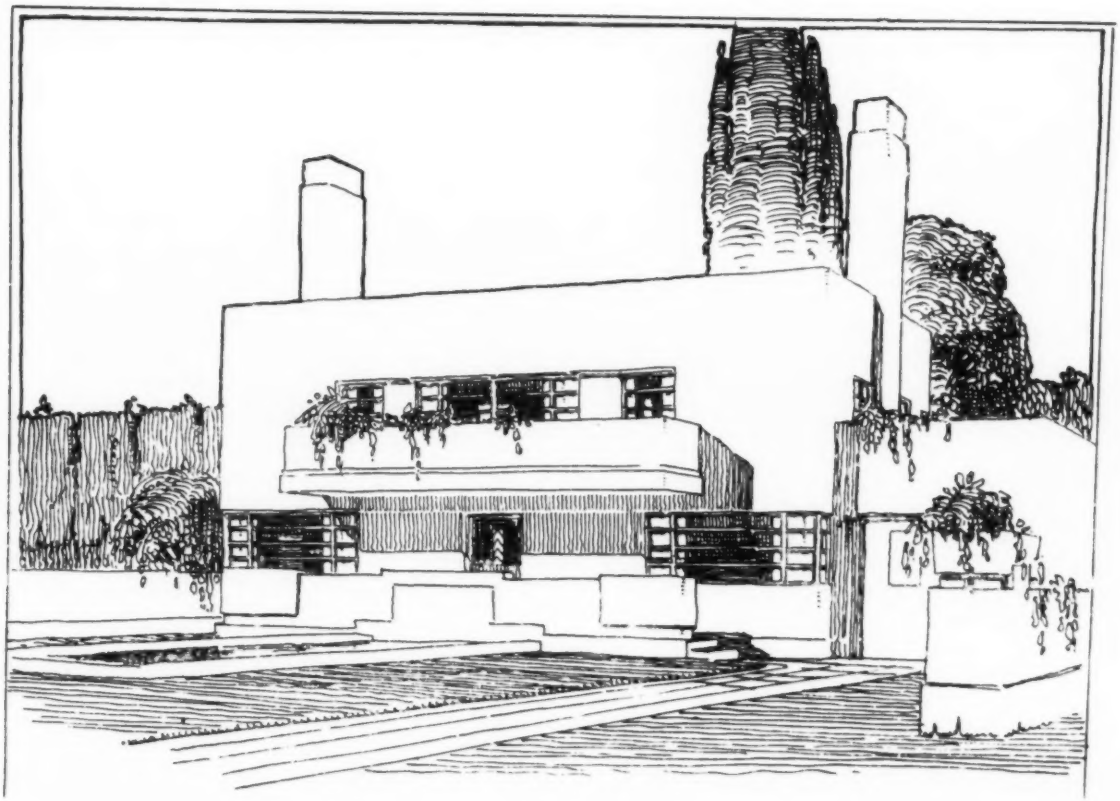
PLOT PLAN
OF VILLAGE

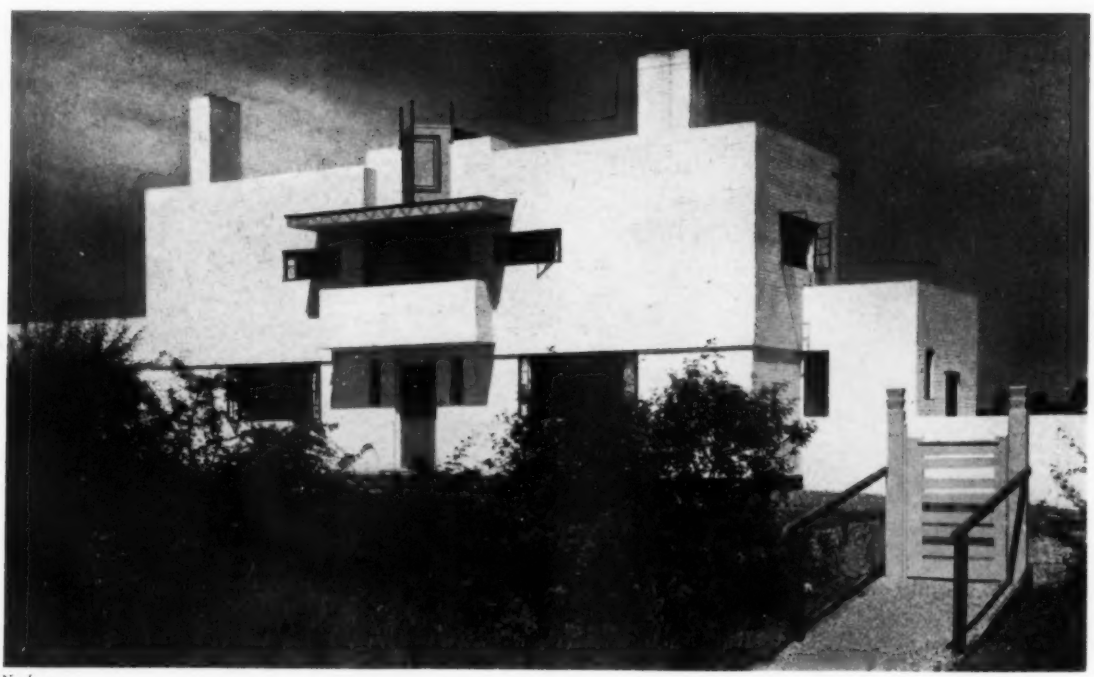


Interior of Bay

Exterior of Bay

SILVER END GARDEN VILLAGE
ESSEX, ENGLAND
JOHN BURNET AND PARTNERS, ARCHITECTS



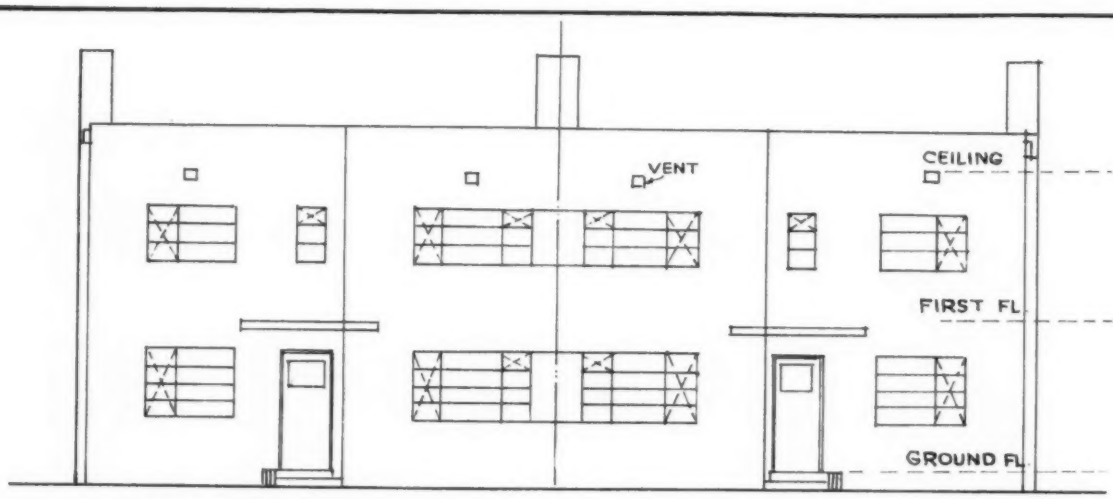


Newbery

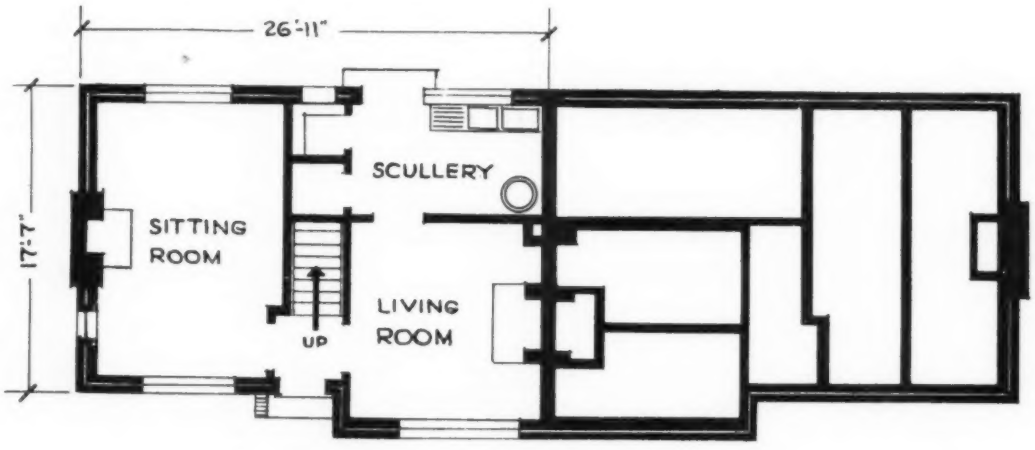
HOUSES AT SILVER END GARDEN VILLAGE
ESSEX, ENGLAND
THOMAS S. TAIT OF JOHN BURNET AND PARTNERS, ARCHITECTS

HOUSES ON SILVER STREET

GENERAL STORES AT SILVER END GARDEN VILLAGE
ESSEX, ENGLAND
JOHN BURNET AND PARTNERS, ARCHITECTS

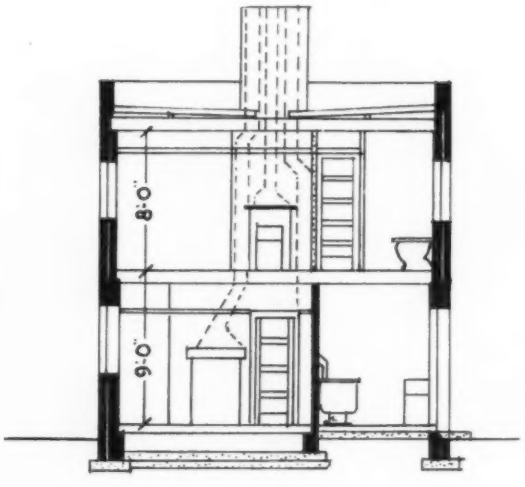


FRONT ELEVATION



GROUND FLOOR

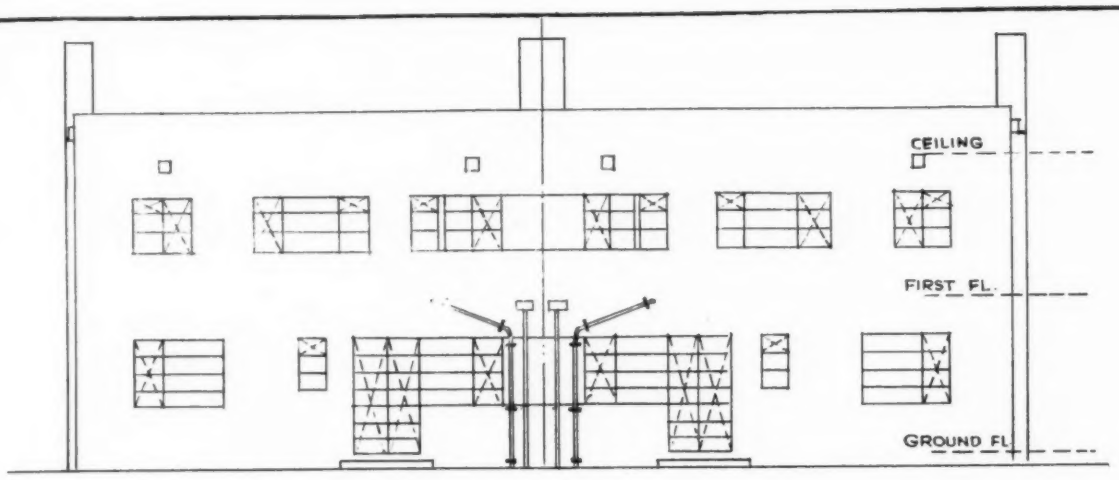
FOUNDATION



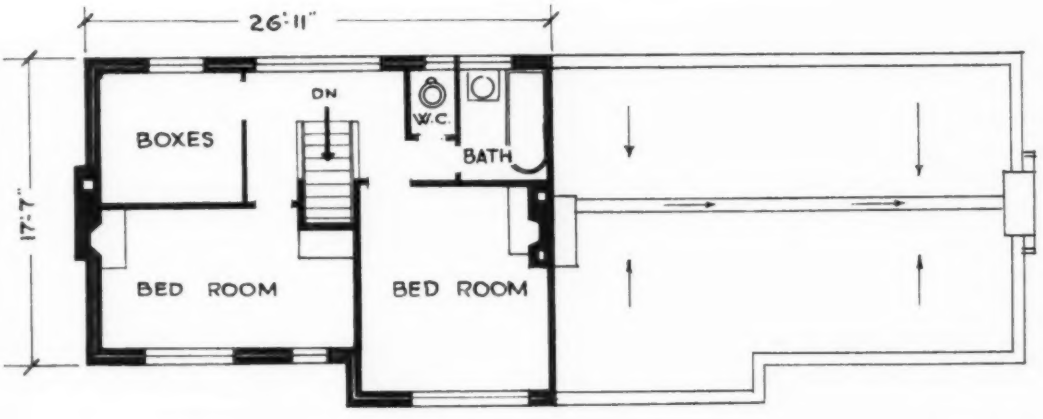
SECTION

SILVER END GARDEN VILLAGE
ESSEX, ENGLAND

JOHN BURNET AND PARTNERS
ARCHITECTS



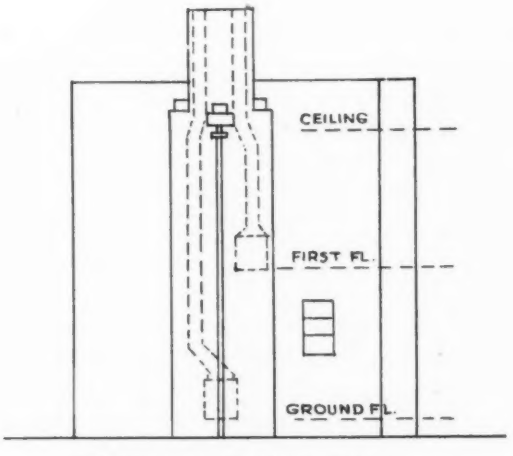
BACK ELEVATION



FIRST FLOOR

ROOF

PARLOR HOUSE TYPE
SILVER STREET



END ELEVATION

Each cubicle is amply provided with light from an individual window.

Mills Metal Cubicles

CUBICLES IN HOSPITALS

CORNELIUS S. LODER

Cubicles are now in use in 80 per cent of our hospitals. Their installation can be accomplished without extensive cost.

When installed in old buildings they only slightly increase weight; they are fireproof and may reduce the fire insurance premium. On the other hand, in the planning of a ward for patients' beds, additional space would be required if cubicles were used. Thus, if a large open adult ward were to be constructed for cubicles, the floor area per cubicle bed would be increased from about 75 sq. ft. to about 105 sq. ft., and the number of beds would be reduced from about 45 to 35. This would increase the cost from about $500 to $650 a bed. The estimated cost, including installation, for eight cubicles is about $750 or about $95 a cubicle. However, the advantages offered by cubicle service are unique and in many cases indispensable.

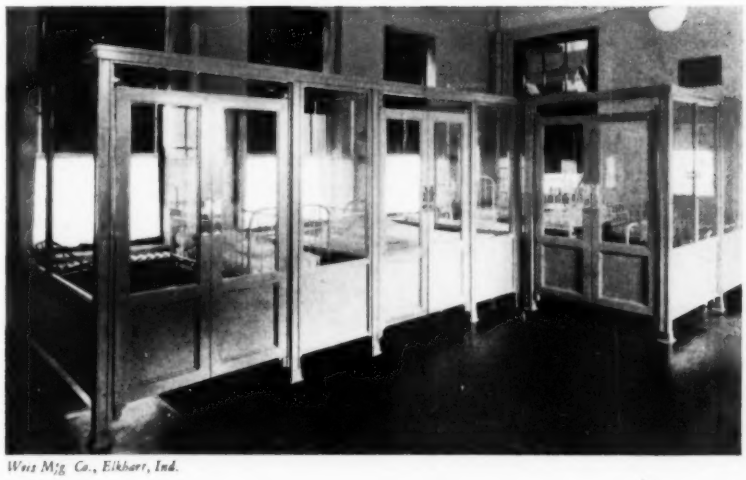
The best type of cubicle has walls 7 ft. in height; the walls rest on legs of steel firmly fastened to the cement or other hard material floor. The space between the cubicle wall and the floor should be 12″ to 18″, preferably 16″, to allow for the convenient cleaning of the floor. The fourth side of the cubicle is usually open, and when privacy is desired, a curtain hanging on a rod can be drawn across the opening. The cubicle walls have been extended to the ceiling only in exceptional cases in order to keep out odor or noise. This additional height increases the cost.

Cubicle walls are generally made of metal and the upper part, from the level of the patient's head, of glass. The wall length of an adult's cubicle is from 7 ft. to 12 ft., depending on the corridor space available. The width of the cubicle is 7 ft. to 10 ft. The size of a child's cubicle is 6 ft. by 5 ft. The glass panes in the upper part of the wall in a child's cubicle can be made smaller or possibly thicker in order to lessen the risk of breakage. In children's wards the use of wired glass is very appropriate.

Ventilation, heating and lighting of cubicles is important. Cubicles located in the center of a ward are not so well ventilated as those placed along the sides and opening into the center of the room. Each cubicle should have its own window; in the reconstruction of wards in old hospitals this is sometimes rather difficult to arrange. It is very seldom that patients in two different cubicles sharing one window agree upon the ventilation. A modern cubicle should also have its own radiator, if possible, and hot and cold running water. A cubicle can be furnished like a private room. Bright

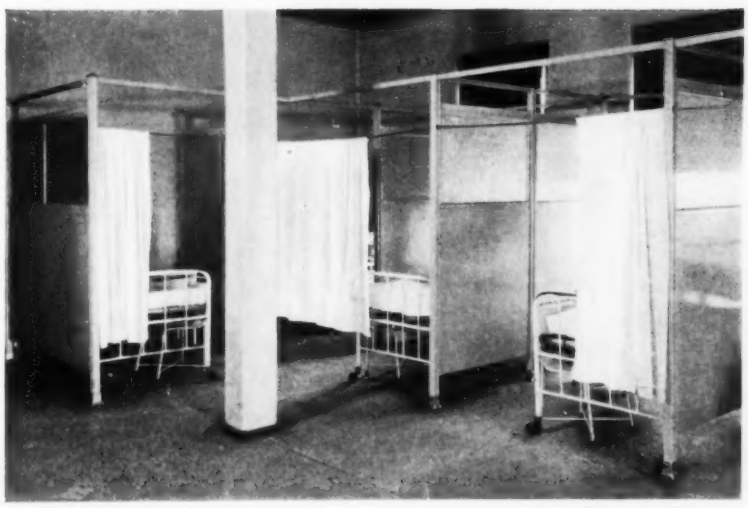
Four-bed cubicles in a large ward. Considerable privacy and isolation is secured without any loss of light.

Mills Metal Cubicles



These cubicles in the children's ward of a hospital in Boston have glass doors so that visitors need not enter the cubicles but can observe the patients from outside.

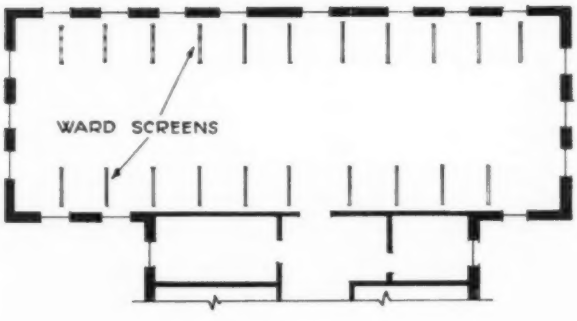
West Mfg. Co., Elkhart, Ind.



Hospital in Braddock, Pa. Cubicles have opaque glass in upper part of walls. Curtains hang on heavy wire.

Sanymetal Products Co.

N. L. Judd Co.



FRENCH HOSPITAL, NEW YORK
CROW, LEWIS AND WICK, ARCHITECTS

and cheerful colors can be chosen for floor-covering, walls and furniture.

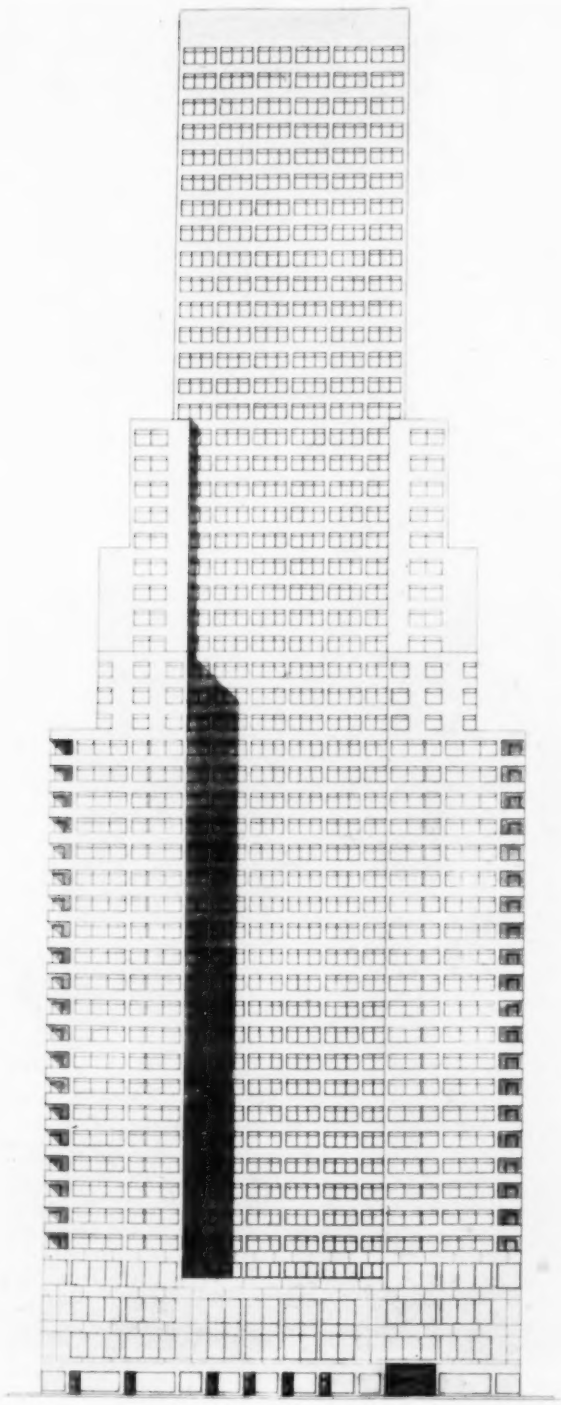
For the upper part of the cubicle walls either ordinary glass or ultra-violet ray glass permitting the transmission indoors of the invisible and beneficial rays of the sun can be used, especially in obstetrical rooms where complete privacy is desired. On the flat hospital roof cubicles can be built entirely of ultra-violet glass; they can also be installed on piazzas and piazza roofs or on the grounds.

The cubicle offers sociability. A small glass door can be arranged in the window pane in the upper part of the wall near the patient's head and opened at certain times, permitting the patients to converse with each other. When so desired these panes can be closed. This is a desirable arrangement in children's wards.

Another advantage of the cubicle system is in controlling cross-infection. This fact is of greatest importance in children's hospitals.

For hospitals which, at the present moment, can afford only the very smallest expense for the building of cubicles, there is the possibility of installing the cubicle frames, and in place of walls curtains of various materials on non-stretchable wire or rod can be substituted temporarily.

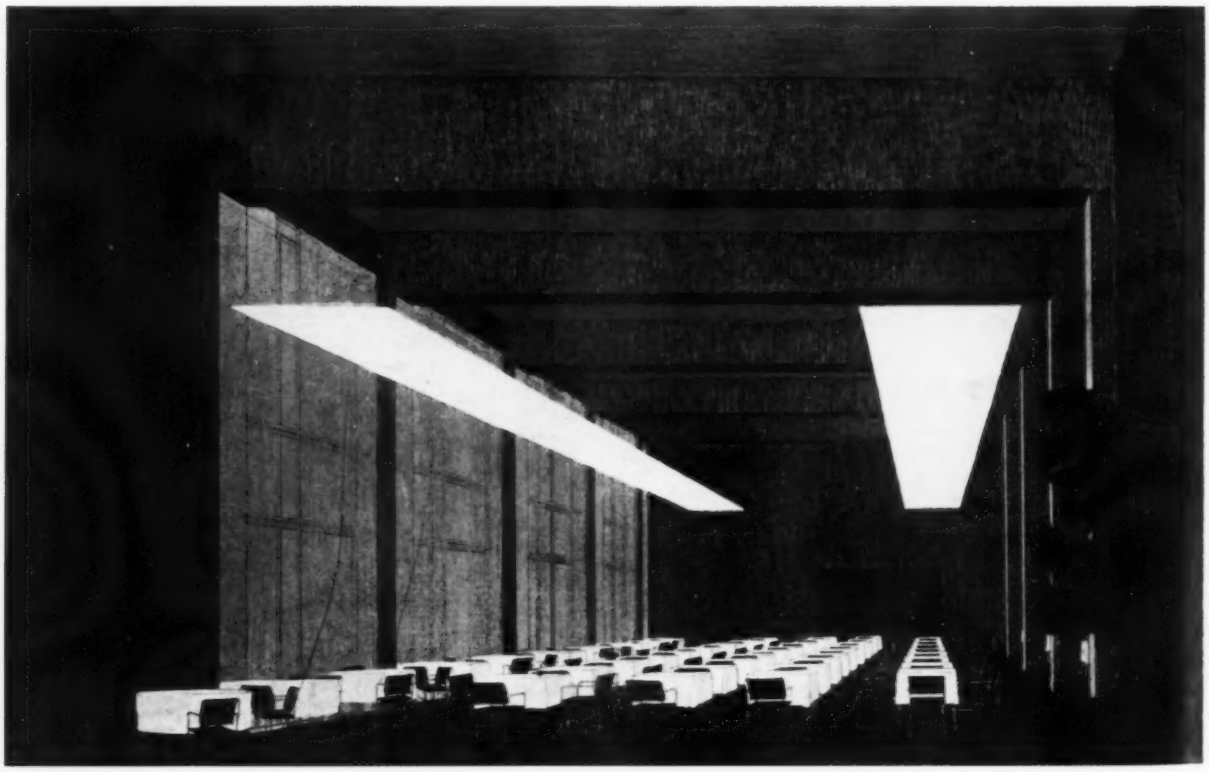
DESIGNS
BY
WILLIAM MUSCHENHEIM
NEW YORK



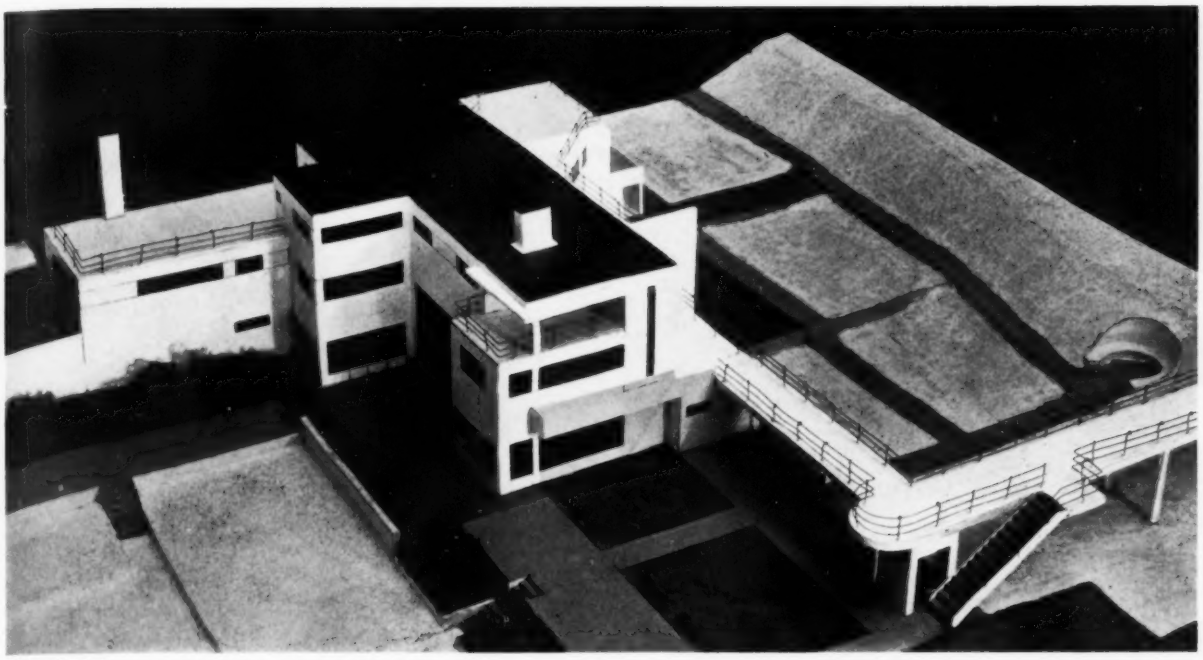
APARTMENT
HOTEL
NEW YORK CITY

J. Scherb

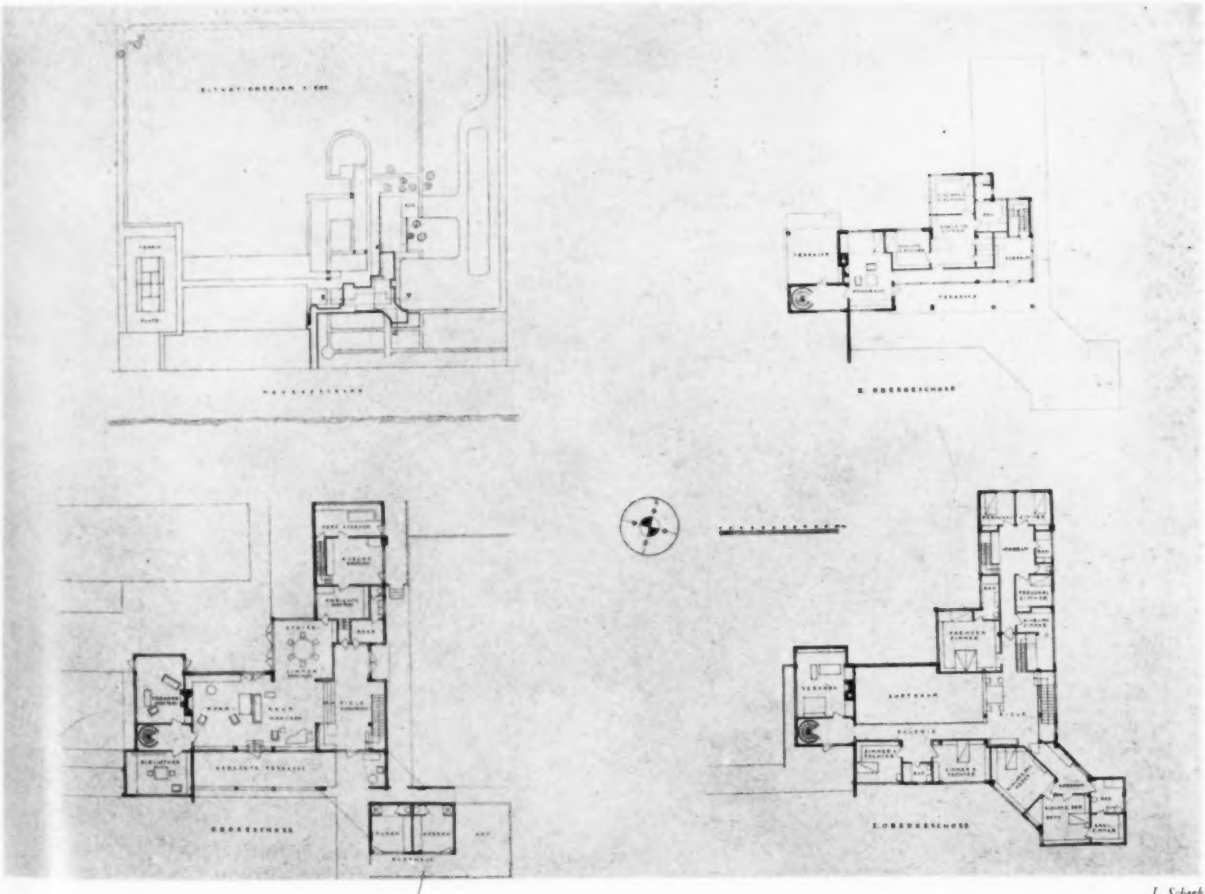
J. Scherb



APARTMENT HOTEL, NEW YORK CITY
WILLIAM MUSCHENHEIM, ARCHITECT
ISOMETRIC VIEW AND DINING ROOM



Nyholm and Lincoln

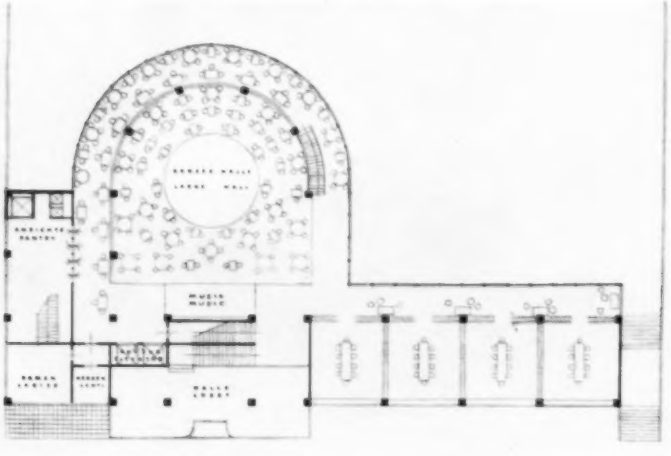


J. Scherb

SUMMER RESIDENCE AT THE DUNES
LONG ISLAND, N.Y.
WILLIAM MUSCHENHEIM, ARCHITECT

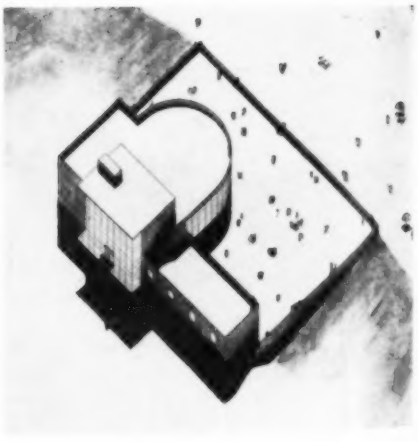
NORTH ELEVATION

SOUTH ELEVATION

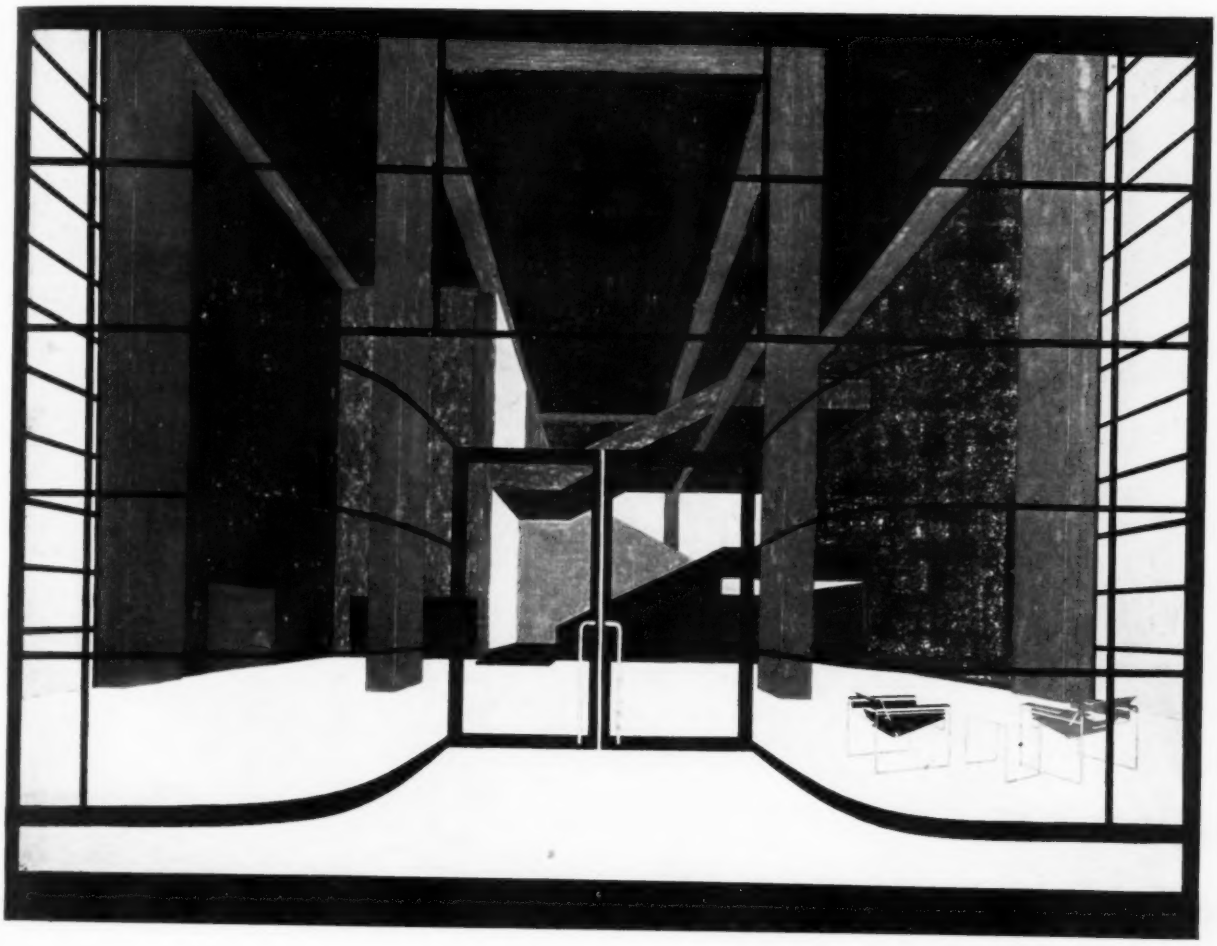


J. Scheib

MAIN FLOOR



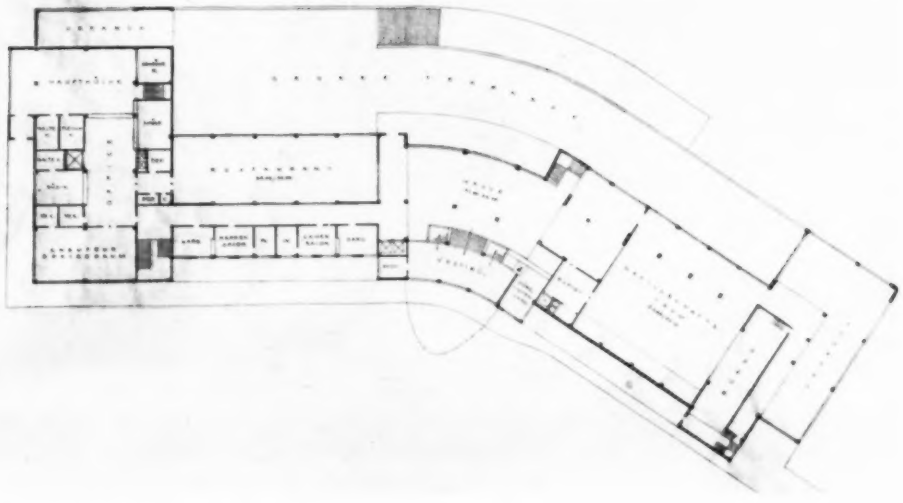
DANCE PAVILION AT THE SEA
LONG ISLAND, N.Y.
WILLIAM MUSCHENHEIM
ARCHITECT



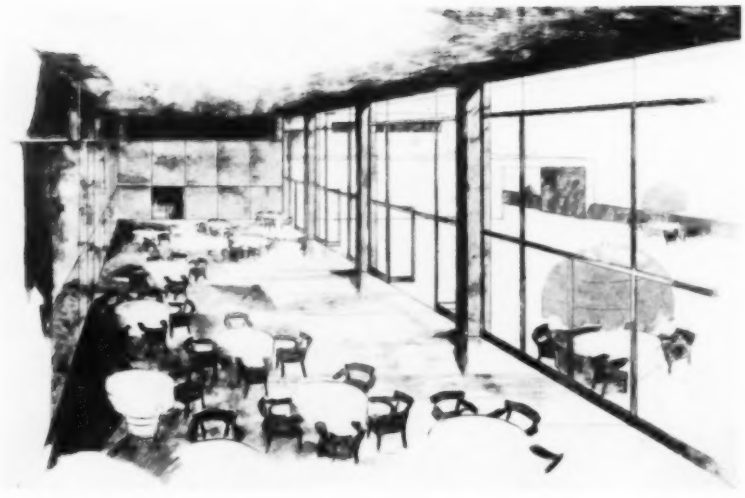
DANCE PAVILION AT THE SEA
MAIN ENTRANCE

WILLIAM MUSCHENHEIM, ARCHITECT

SOUTH ELEVATION



MAIN FLOOR



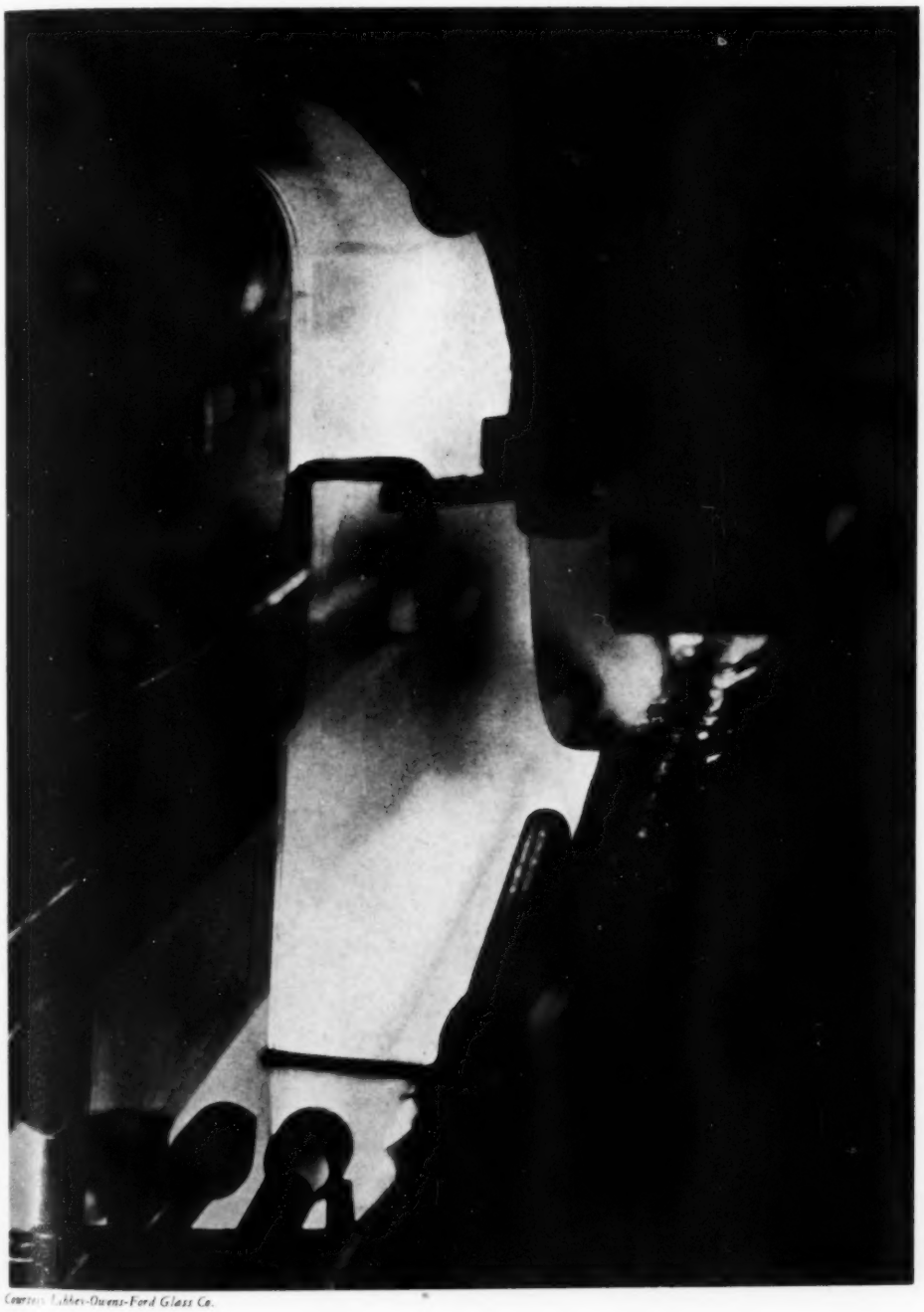
DINING ROOM

CLUB HOUSE, LONG ISLAND, N. Y.
WILLIAM MUSCHENHEIM
ARCHITECT

TECHNICAL NEWS AND RESEARCH

GLASS

BY
K. LÖNBERG-HOLM



Courtesy Libbey-Owens-Ford Glass Co.

MANUFACTURE OF SHEET GLASS

MODEL FOR OFFICE BUILDING, MIES VAN DER ROHE, ARCHITECT

PHYSICAL PROPERTIES OF GLASS

PERMEABILITY TO VISIBLE RADIATION

VOLUME OF TRANSMISSION

The volume of transmission varies with the following factors:

1. *Chemical properties of the glass*

The volume of light transmitted by glass is in direct proportion to the purity of its composition. No ordinary glass can transmit more than about 91% of the incident light. When a light ray strikes a plate glass vertically about 4% is reflected from its upper surface and about 3 or 4% from its lower surface; the remaining light being transmitted and absorbed. The amount of reflected light varies with the optical property of the glass known as the *refractive index* (the number which expresses the ratio of the sine of the angle of incidence to the sine of the angle of refraction) but this variation is a minor factor in the consideration of ordinary clear glasses, because of the small range of the refractive index. (From 1.45 to 1.96.)

2. *Nature and distribution of incident light flux.*

3. *Shape and reflection factor of the background or enclosure around the lightsource.*

4. *Angle of incidence.*

The percentage of light reflected increases with the angle of incidence (the angle between the light ray and a line perpendicular to the surface). (Fig. 1.) The percentage of light reflected increases very gradually up to about 45 degrees incidence. It then increases rapidly, becoming 100% at 90 degrees incidence. This is a very considerably loss in daylighting equipment as the transmission factor of even plain glass is less for light reaching it from many angles than for a perpendicular beam of light. Laboratory tests (1)* on daylight in relation to windows showed that filling a window opening with clear plate glass resulted in lowering the minimum illumination at the rear of the room by 42%, and it was concluded that this possibly was due to the amount of artificial skylight reflected back from the glass.

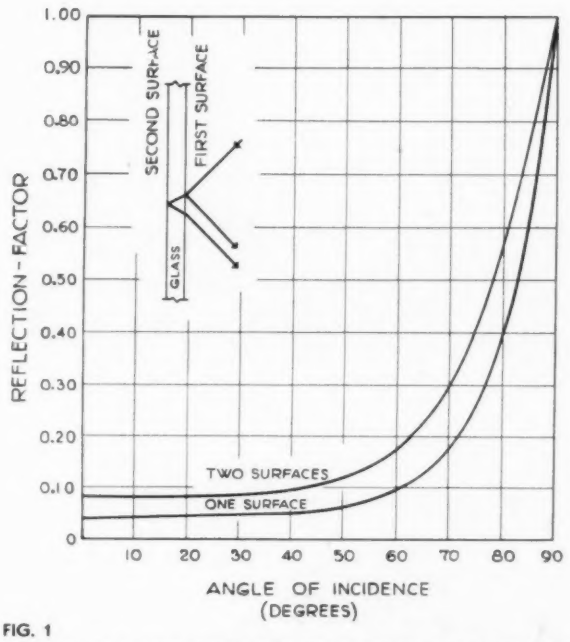


FIG. 1

PERCENTAGE OF INCIDENT LIGHT REFLECTED BY ONE AND TWO SURFACES OF CLEAR PLANE GLASS FOR VARIOUS ANGLES OF INCIDENCE (2).

5. *Facial characteristics*

Inasmuch as the transmission factor of a glass which is rough on one side (sandblasted, pebbled, ribbed or modelled) is appreciably less when the smooth side is toward the lightsource than when the rough side is, the transmission factor is given for both conditions in Table 1. Other considerations being equal these glasses should be used with their rough side toward the lightsource.

Specimen of Glass	Side Toward Lightsource	Transmission Factor	
		Perpendicular Beam	Hemispherical Illumination
Plane	.....	0.90	0.80
Sandblasted	Rough	.78	.70
Sandblasted	Smooth	.74	.70
Pebbled	Rough	.85	.75
Pebbled	Smooth	.79	.75
Coarse Ribbed	Rough	.77	.62
Coarse Ribbed	Smooth	.52	.62
Fine Ribbed	Rough	.86	.79
Fine Ribbed	Smooth	.79	.79
Wavy	Rough	.88	.82
Wavy	Smooth	.86	.82

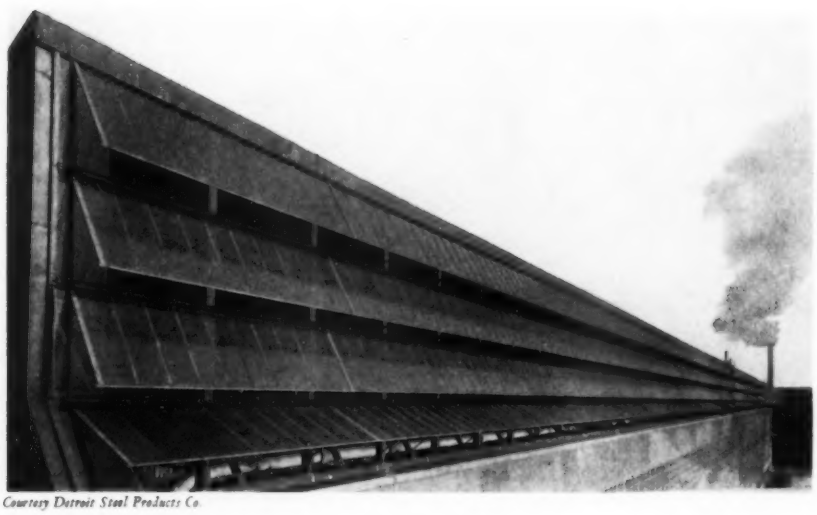
Table 1.

Transmission factors of typical glasses for direct and diffused light. (2).

* Figures in parentheses throughout the text indicate references given at end of each chapter.

Courtesy Detroit Steel Products Co.

MONITOR, FORD MOTOR CO.
DEARBORN



Courtesy Detroit Steel Products Co.

MONITOR, FORD MOTOR CO.
DEARBORN

Courtesy Detroit Steel Products Co.

MONITORS, LINK BELT CO.
PHILADELPHIA

Material	Light Reflected			Light Transmitted			
	In Concentrated Beam	In Spread Beam	Diffused in all Directions	In Concentrated Beam	In Spread Beam	Diffused in all Directions	Light Absorbed
Crystal Glass							
Clear	8–10*	.....	.....	80–85	.....	.....	5–10
Frosted or Pebbled (A)	4– 5	5–10	.....	.....	70–85	.....	5–15
Frosted or Pebbled (B)	.....	8–12	.....	.....	72–87	.....	5–15
White Glass							
Very Light Density (A)	4– 5*	.....	10–20	5–20	.....	50–55	8–12
Very Light Density (B)	.....	3– 4	10–20	.....	5–20	50–55	10–15
Heavy Density	4– 5*	.....	40–70	.....	.....	10–45	10–20
Mirrored Glass	82–88	.....	.....	.....	.....	.....	12–18

(A) Smooth side toward lightsource.
(B) Roughed on side toward lightsource.
* For angles up to 45 deg.; for angles greater than 45 deg. this value rises considerably.

Table 2.

Characteristics of materials.
(Courtesy: National Lamp Works, Nela Park, Cleveland).

6. *Surface dirt*

Dirt accumulations reduce the volume of light available for distribution. Measurements of intensities of illumination before and after cleaning the glass area in many cases show an increase as much as 5 to 10 times, and it is not uncommon to increase the illumination intensity in some parts of the interior from an average of one foot-candle with dirty glass to as high as 15 foot-candles (2).

FACTORS INVOLVED IN THE ACCUMULATION OF DIRT ON WINDOW GLASS

(a) Atmospheric conditions

Particularly in factory districts glass rapidly accumulates a film of dirt.

(b) Time and place of exposure

Investigations of dirt as related to daylighting in industrial buildings (3) have shown that the accumulation of dirt on a window over a given length of time is about 75% on the inside and 25% on the outside. Probably this is due to occasional rains which wash off some of the outside dirt. This point is particularly significant with relation to sloping windows or skylights, which are more difficult to wash on the inside than vertical windows.

(c) Angle at which the glass is placed

Sloping surfaces collect dirt more rapidly than vertical surfaces and these are therefore more efficient light-transmitting media over a period of time.

(d) Facial characteristics

The facial characteristics of the glass seem to have very little to do with the amount of dirt collected. While it was found (3) that various types of glass collected dirt in about the same quantities, some of them retained it more tenaciously when cleaning was attempted. In selecting a window glass this point should be carefully considered as the cleaning methods and perhaps the actual cost may depend upon the ease with which the accumulated grime may be removed.

Four types of glass are commonly used in industrial buildings (3):

1. *Clear Sheet*—transmission factor 82% when clean;
2. *Vertically Ribbed*—transmission factor 72% when clean;
3. *Horizontally Ribbed*—transmission factor 72% when clean;
4. *Rough or Hammered Wire*—transmission factor 78% when clean.

(In all cases it is assumed that the light is unobstructed and diffused.)

The report (3) concludes that with the collection of six months' dirt there is little advantage in any of these glasses over any other. Clear glass and rough or hammered glass are much easier to clean, however, than either vertically or horizontally ribbed glass. Under certain conditions, it is possible to

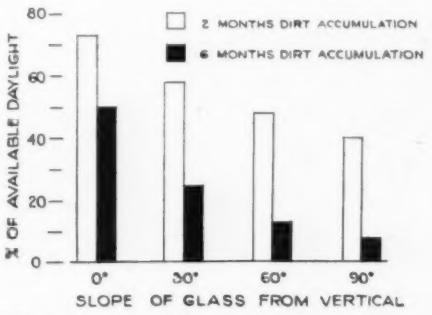
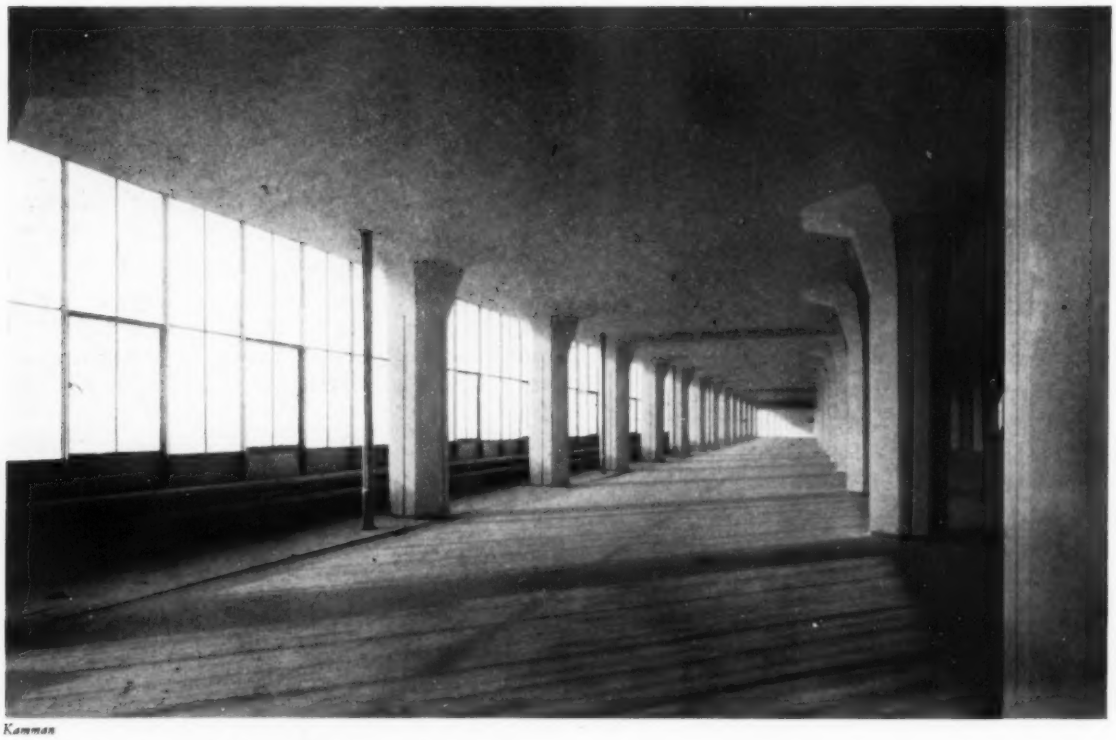


FIG. 2
RELATION OF DIRT ACCUMULATION TO SLOPE OF GLASS (3).

Courtesy The W. Bayley Co.

MONITOR, HALL PRINTING CO., CHICAGO



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VAN NELLE TOBACCO FACTORY, ROTTERDAM

J. A. BRINKMAN AND L. C. VAN DER VLUGT, ARCHITECTS

increase the minimum daylighting by using rough glass with the rough side in, this being especially true where the windows are somewhat obstructed on the outside by adjacent buildings. On the other hand, for practical purposes the rough side should be out since it is desirable to wash the inside oftener and the smooth glass is easier to wash than the rough.

If the windows are to be washed once a year only, as is the case in some industries, this should *not* be "spring-cleaning" but should take place in the fall so that the glass may be as efficient as possible when the need is greatest.

All daylighting values for industrial buildings should be figured on the basis of six months' dirt accumulation. (3)

CONTROL OF THE LIGHT FLUX

REFRACTION

When a beam of light enters glass obliquely from air the direction of its path is abruptly changed. The amount of this *refraction* depends upon the ratio of the velocities of the light as it passes through the two media. Advantage is taken of this property of glass to alter and to control the course of light rays. It is also possible to reflect all the light by means of glass prisms as shown in Fig. 3. After a ray of light enters glass it is totally reflected at a bounding plane if it is incident upon this plane at a sufficiently large angle. Prisms and lenses have an extensive use in lighting equipment, in refracting and breaking up light. Many designs of glass having prismatic forms are on the market. When properly designed and installed an appreciable control of natural light entering interiors is obtained. These glasses are usually employed for the purpose of gathering oblique light from the sky and sending it in a general horizontal direction into the parts of the room at some distance from the lightsource. Unless kept quite clean prismatic glass loses its value.

DIFFUSION

Diffusion (multiple refraction) of the light flux without glare can be obtained by:

(*a*) *Varying the chemical composition of the glass*

Highly diffusing glass such as opal, opalescent or "milk" glass diffuses about as much light outward as it does inward. (Fig. 4, 5.) If it is perfectly diffusing it reflects *more* light outward. If one holds a piece of this highly diffusing glass in the path of light rays, it is readily seen that the glass is fully as bright when viewed in the direction of the light rays as when viewed in a direction toward the lightsource. This means that about as much light is diffusely reflected outward (toward the lightsource) as is

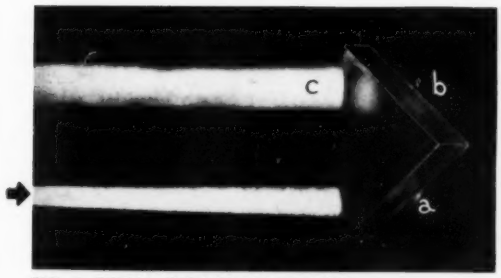


FIG. 3. TOTAL REFLECTION BY PRISM

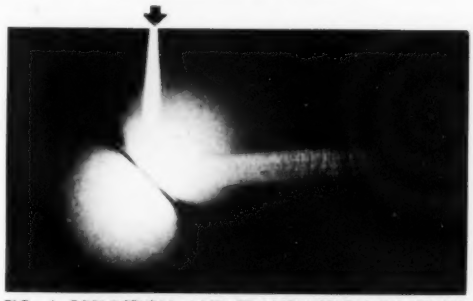


FIG. 4. REFLECTION AND TRANSMISSION BY WHITE OR MILK GLASS

FIG. 5. TRANSMISSION AND REFLECTION OF WHITE GLASS. VERY LIGHT SAMPLE

FIG. 6. REFLECTION AND TRANSMISSION BY ETCHED GLASS. SMOOTH SIDE TOWARD BEAM

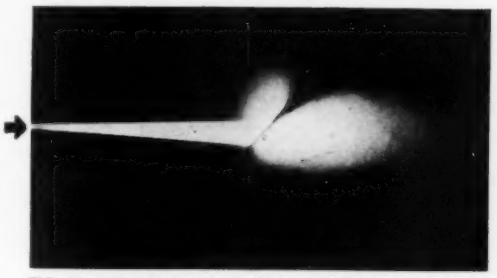
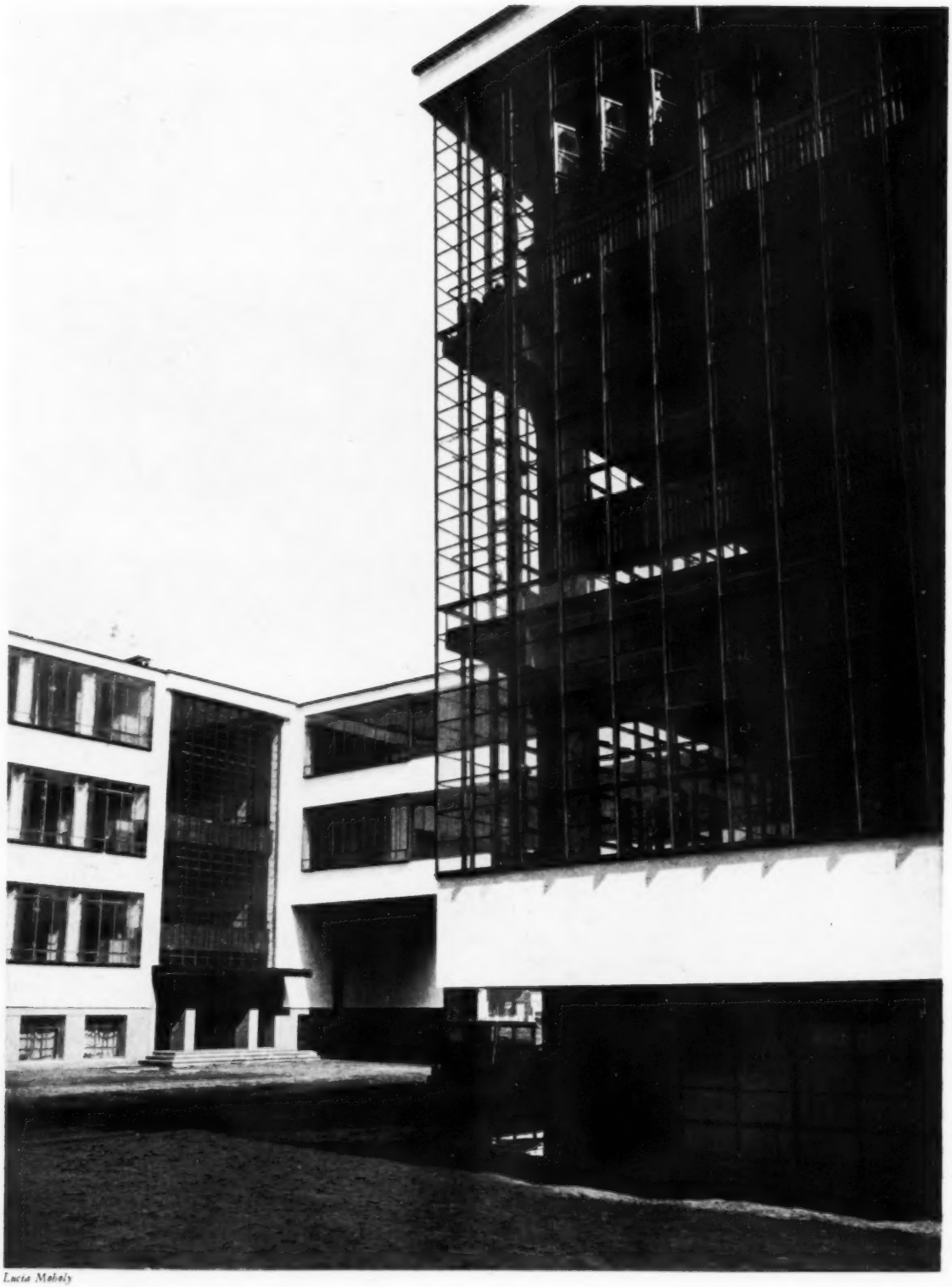


FIG. 7. REFLECTION AND TRANSMISSION BY ETCHED GLASS. FROSTED SIDE TOWARD BEAM

Courtesy National Lamp Works, Nela Park, Cleveland



Lucia Moholy

BAUHAUS SCHOOL, DESSAU, WORKSHOPS, WALTER GROPIUS, ARCHITECT

diffusely transmitted inward. This is true to some extent, but not to the same degree, of sand-blasted or so-called "frosted" glass. (Fig. 6, 7.)

Type	Thickness In.	Diffusion	% Reflection	% Transmission	% Absorption
Clear	.079-.157	None	6- 8	90-92	2- 4
Frosted Clear	.071-.130	Little	6-19	60-91	3-14
Ornamental	.118-.177	Little	6-20	70-91	3-14
Opalescent	.071-.098	Little	13-28	59-84	3-13
Solid Opal	.051-.157	Good	52-74	10-38	6-24
Flashed Opal	.071-.122	Good	29-52	36-66	3-10
Alabaster	.315-.630	Good	45-67	17-36	14-33

Table 3.

Diffusion, reflection, transmission and absorption factors for various glass. (4).

A loss of energy is connected with this diffusion. This light absorption is a function of the thickness and the chemical composition of the glass.

(b) Surface patterns

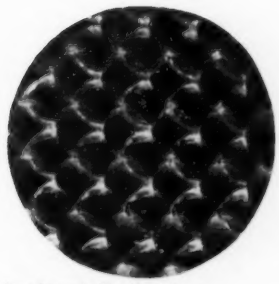
A moulded surface scatters the light flux. The chief functions of a surface pattern are to break up the direct rays from the lightsource and to redirect the light passed through.

Diffusion for the purpose of obstructing vision can be obtained by the use of rough, hammered or pebbled glass that spreads the light in an irregular manner.

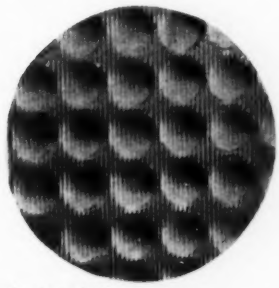
A great number of glasses are on the market with surface patterns designed for the highest transmission of light, for diffusion that reduces glare to a minimum and obstructs vision, and for controlled deflection.

The volume of transmission depends to a certain degree on the character of the flat surface of these glasses. A rolled surface is more or less rough. For full efficiency it should be ground and polished. The surface patterns should be shallow without grooves and sharp angles, for ease of cleaning. Ribbed glass spreads the light in a direction perpendicular to the ribs. Glasses with prismatic patterns or patterns composed of convex lenses spread the light equally in all directions.

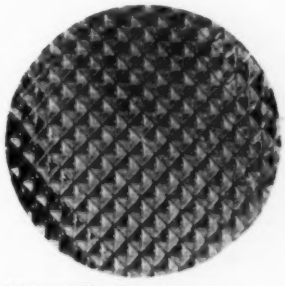
Laboratory tests on transmission of light through window glass (5) have proven the possibility of increasing the illumination on a horizontal plane in the back of a room by employing horizontally ribbed glasses. But it is generally found objectionable to face windows glazed in this manner as the contrast between the window and the surroundings is too extreme, especially where these windows face direct sunlight. By employing a glass which will completely break up the direct rays of the sun, the illumination, though of a lower intensity, may be more efficiently utilized.



Manufacturer's Glass Co., Chicago

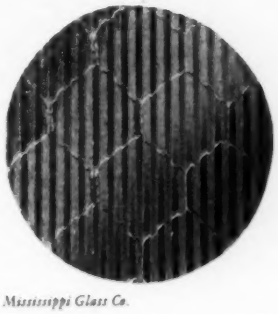


Manufacturer's Glass Co., Chicago



Mississippi Glass Co.

Mississippi Glass Co.



Mississippi Glass Co.

SURFACE PATTERNS FOR DIFFUSION AND CONTROLLED DEFLECTION

Bornes

RESTAURANT, STOCKHOLM EXPOSITION, E. C. ASPLUND, ARCHITECT

The authors conclude that the large number of variations which are encountered in natural lighting problems must all be taken into consideration when selecting the glass which will give the best average results, and that upon the whole, glass of the type with a surface pattern that gives a uniform diffusion of sunlight appears to be most satisfactory throughout.

MIRRORS

Similar to the reflection characteristics of polished metal are those of mirrored glass. Figs. 8 and 9 show the path of a ray of light striking the surface of a commercial type of mirror with silvering on the back of the glass. A small part of the light is at once reflected by the polished surface of the glass without passing through to the silvered backing; the remainder passes through the glass to the silver, from which it is reflected through the glass again and out along a line parallel to the ray reflected from the glass surface. The fact that most of the light has to pass through the glass both to and from the reflecting surface makes the silvered mirror a less efficient reflecting surface than the polished silver itself. The loss in the glass depends, of course, on the quality of the glass. The deterioration of a polished metal reflecting surface in service is, however, a factor which often more than offsets its higher initial efficiency.

Special laminated glasses are on the market which will act as a mirror when viewed from the side of the lightsource, but will, to a certain degree, be transparent when viewed toward the lightsource. A fine metallic screen is placed between the two pieces of glass. These glasses are extensively used in speakeasies.

ABSORPTION OF LIGHT

Light absorption can be controlled by varying the chemical composition and the thickness of the glass. By coloring the glass the absorption can be limited to certain ranges of the spectrum. The transmission factor of colored glasses is to a certain extent a function of temperature.

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2. *Light and Work*, by M. Luckiesh.
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5. *Transmission of Light through Window Glass*, paper by E. H. Hobbie and W. F. Little in Transactions, Illuminating Engineering Society, September, 1926.

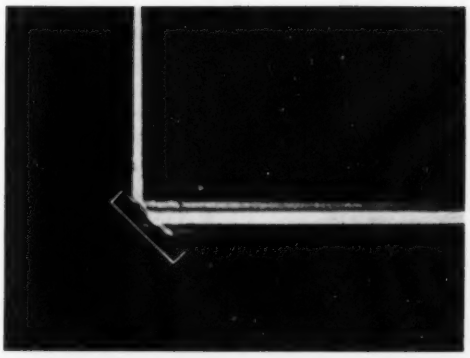


FIG. 8. REFLECTION FROM MIRROR

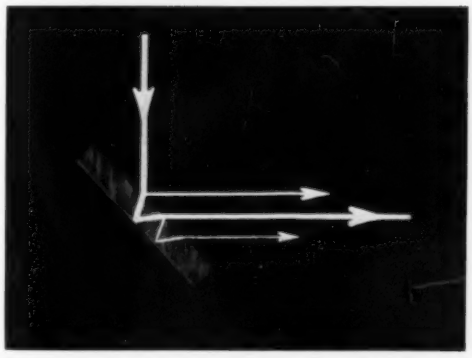


FIG. 9. DIAGRAM OF REFLECTION FROM MIRROR

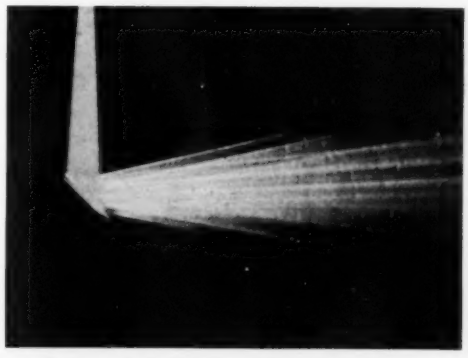


FIG. 10. REFLECTION FROM FLUTED MIRROR

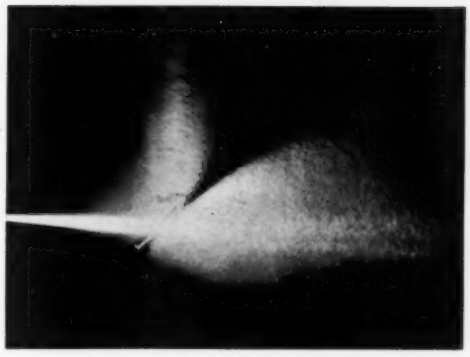
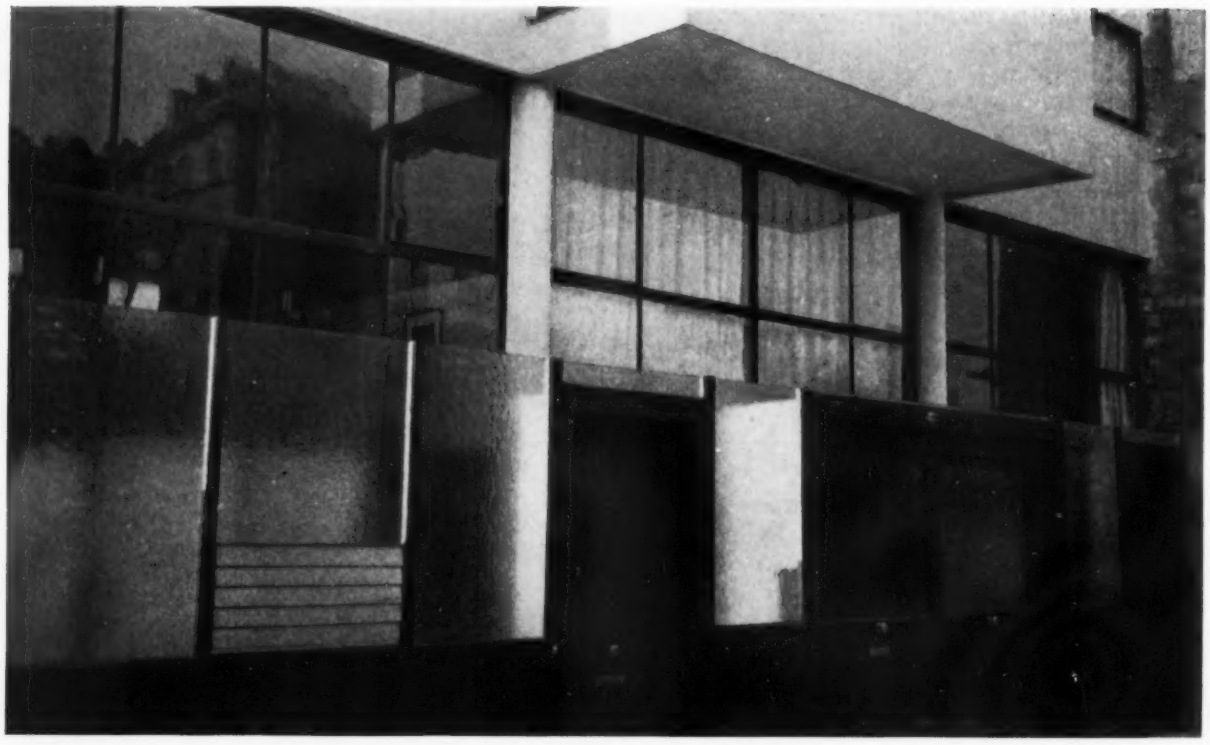


FIG. 11. REFLECTION AND REFRACTION BY FACTORY RIB GLASS

Courtesy National Lamp Works, Nela Park, Cleveland

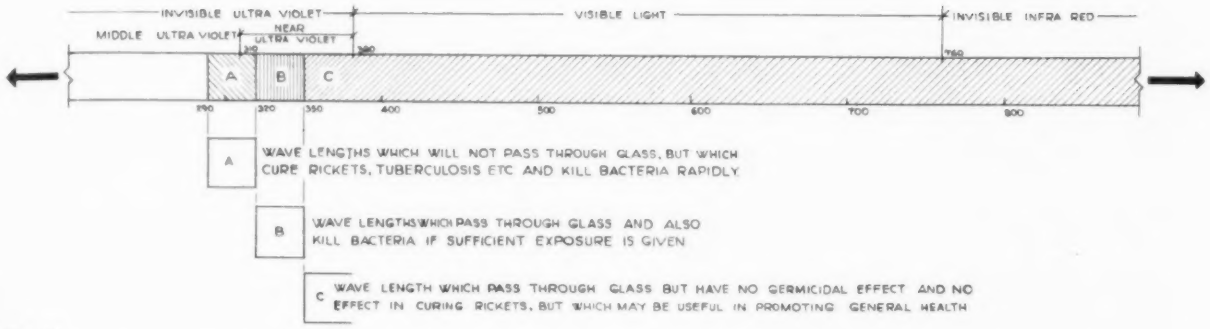


ENTRANCE

STUDIO

PLANEIX HOUSE, PARIS, LE CORBUSIER AND P. JEANNERET, ARCHITECTS

PERMEABILITY TO SHORT WAVE LENGTH ULTRA-VIOLET RADIATION


INVISIBLE ULTRA VIOLET
MIDDLE ULTRA VIOLET
NEAR ULTRA VIOLET
VISIBLE LIGHT
INVISIBLE INFRA RED
290
320
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700
800
A WAVE LENGTHS WHICH WILL NOT PASS THROUGH GLASS, BUT WHICH CURE RICKETS, TUBERCULOSIS ETC AND KILL BACTERIA RAPIDLY
B WAVE LENGTHS WHICH PASS THROUGH GLASS AND ALSO KILL BACTERIA IF SUFFICIENT EXPOSURE IS GIVEN
C WAVE LENGTH WHICH PASS THROUGH GLASS BUT HAVE NO GERMICIDAL EFFECT AND NO EFFECT IN CURING RICKETS, BUT WHICH MAY BE USEFUL IN PROMOTING GENERAL HEALTH

FIG. 12

DIVISION OF SOLAR RADIATION WITH INDICATIONS OF THE BANDS OF WAVES WHICH WILL PASS THROUGH ORDINARY WINDOW GLASS AND WHICH ARE OF THERAPEUTIC VALUE. WAVE LENGTHS ARE MEASURED IN MILLIMICRONS (mμ). A MILLIMICRON IS ONE-MILLIONTH OF A MILLIMETER (I).

SIGNIFICANCE

In general any material body or fluid is not transparent to radiant energy of all wave lengths. Ordinary clear glass is quite transparent to visible radiation or light but is opaque to ultra-violet radiation of the "middle" ultra-violet region (Fig. 12). The exact value of the amount of ultra-violet shut out by ordinary glass depends greatly upon the transparency of the sample of glass selected. Biologists have proven that the ultra-violet rays shut out by ordinary window glass have a special therapeutic value, especially in preventing rickets. (The rays necessary to the manufacture of vitamin D, the vitamin that controls the utilization of lime in bones, blood and tissues). Biological researches show that the strong emission line at 313 mμ has only a slight or doubtful value in preventing rickets (2) and that ultra-violet rays of longer wave lengths have no antirachitic potency. Since in the wintertime in the northern latitudes the short wave length limit of solar radiation is about 305 mμ, it appears that the spectral range of ultra-violet solar radiation useful for therapeutic purposes in preventing rickets is only 5 to 10 mμ in width. (2). The beneficial effect depends upon the time of exposure, transmissibility of the glass and intensity of the active rays. The transmissibility of glass can be extended toward shorter wave lengths so as to include the beneficial rays. It varies as a function of:

(a) Chemical composition

Various kinds of glass which are permeable to ultra-violet radiation in varying degrees are now on the market. The actual percentage of transmission of this portion of the spectrum permitted by these glasses has been determined by the Bureau of Standards (2) and biologically by the Council on Physical Therapy of the American Medical Association (3). The last-mentioned report concludes that glasses are now available which satisfactorily meet the requirements of permeability to the requisite ultra-violet radiation together with protection against the weather. The question of decrease (see below under SOLARIZATION) in this transmission of ultra-violet radiation suffered by these glasses upon exposure to light had not been brought up at the time of this report by the Council on Physical Therapy. Since then it has been investigated by the Bureau of Standards. (2.)

The Bureau of Standards (2) calls attention to the necessary correlation between the biological data and the physical measurements. The question of QUALITY of light, the proper combination of ultra-violet, visible and infra-red, enters into the efficiency of these special glasses.

The report by the Bureau of Standards (2) mentions a tendency among some distributors of these ultra-violet transmitting glasses to include 320 mμ or even longer wave lengths of the ultra-violet in the spectral range of therapeutic activity and that the inclusion of these wave lengths leads to an incorrect appraisal, as it gives a higher average transmission than seems warranted, when it is recognized that the greatest therapeutic activity occurs in the 302 mμ range of wave lengths shut out by ordinary window glass. Furthermore, since different samples of common window glass transmit from 2 to 20% at 320 mμ there is no special reason for including this wave length in the specification of these ultra-violet transmitting glasses. The report concludes that if the rays at 320 mμ have a

HOUSE VAN DER LEEUW, ROTTERDAM, BRINKMAN AND VAN DER VLUGT, ARCHITECTS

special healing value there would be no need of using special ultra-violet transmitting glass instead of selecting the least greenish (as viewed edgewise) samples of common window glass, which would serve the purpose as well, at a considerable saving in cost.

The necessity of keeping the ultra-violet transmitting glasses clean is indicated by the observations that dirt and dust can reduce the transmission at 302 mμ by 30 to 40 per cent. (2.)

(b) Thickness

The Bureau of Standards (2) gives the following data on heavy wired glass which is of importance for safety in the case of breakage when used on a sloping roof. From calculations on samples of glass which for a thickness of 2.3 mm. transmits 20 to 30%, and from direct observations, it was found that thick (6 mm., one-fourth inch wired) samples of this type of glass transmit only 3 to 5% at 302 mμ. It is shown that this transmission is too low for biological use. Hence, if thick samples must be used for safety, it is concluded that it is necessary to use material that has little or no absorption at 302 millimicrons. Otherwise it will be necessary to use single thickness (2.3 mm.) glass backed with a 1-cm. wire mesh, which shuts out about 10% of the total light.

REFLECTION AND REFRACTION

The reflecting power of these glasses is no higher than that of ordinary glass. All these glasses decrease rapidly in transmission for wave lengths shorter than 365 mμ with increasing thickness. When the thickness is increased to ¼ inch or thicker the transmission is greatly reduced. For thick prisms the transmission would be much lower. Silver has a low reflection (4%) at 320 mμ and hence, unless a better metal can be found, these special window glasses cannot be used for mirrors.

SOLARIZATION

Solarization is the designation of the photochemical reaction that most of these special glasses undergo on exposure to sunlight. A decrease in transmission of ultra-violet radiation occurs as the result of exposure to ultra-violet radiation from artificial sources and from the sun.

The solarization is essentially a problem in photochemistry, which is a function of:

(a) Time of exposure

The rate of solarization decreases rapidly with the time of exposure so that although the drop in transmission during the first day may seem alarming, it is much less during the second day and so on. It is to be noted that as a result of solarization the transmission decreases to a permanent value (2). The time of solarization, the exposure necessary before the glass reaches its permanent transmissibility value, varies with the different glasses. No doubt the time will come when new glasses which will not change in transmission will be on the market. In the meantime it will be necessary to take into consideration possible changes in the short wave length ultra-violet transmission.

(b) Temperature

The Bureau of Standards calls attention to the fact that these glasses can be rejuvenated by heating (2). The photochemical action produced by the ultra-violet rays can be reversed by heat treatment. The rate of recovery depends upon the temperature to which the glass is heated. These facts are considered as evidence in support of the view that solarization is not a destructive process, but is merely a photochemical change that can be driven in either direction, depending on the quality of the activating rays.

(c) Absorptive properties of the material for ultra-violet radiation

The Bureau of Standards' report (2) concludes that it is to be expected that the solarization will continue as long as any of the chemically active material remains uncombined, this being evident from the fact that after the glass has practically ceased to decrease in transmission, because the activating rays cannot penetrate the entire layer of glass, the solarization is renewed on turning the under (previously unexposed) side of the glass toward the source of radiation.

(d) Source of radiation

The sources used by the Bureau of Standards (2) in studying solarization were the sun, which does not contain appreciable radiation of wave lengths less than about 295 mμ, the carbon arc (without and with a glass chimney opaque to wave lengths less than 310 mμ) which has a fairly continuous spectrum of ultra-violet radiation, and the mercury arc in which the ultra-violet radiation is confined principally to a number of strong emission bands at 254 to 365 mμ. All of these sources lower the transmission of these glasses, the unfiltered radiation from the artificial sources apparently causing a somewhat greater decrease in transmission than sunlight. The Bureau of Standards suggests (2) that this may be owing to the fact that some of these window glasses solarize but slowly, and may not have attained minimum transmission in the time (one year) allotted for the test. It is concluded however, that whether we solarize these glasses

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by exposure to the sun or obtain the photochemical stabilization by exposure to an artificial source of radiation (the mercury arc) containing ultra-violet wave lengths not present in sunlight, the same *relative* transmissions are obtained. It was found that the transmission decreased to a constant value which for some glasses is only about one-half the transmission when new. In conclusion it is stated that owing to the slowness of some glasses in coming to photochemical equilibrium on exposure to the sun, it will require several years to determine whether the accelerated test with artificial source of radiation is too severe, but that the outstanding difference in the transmission between the samples of glass subjected to the accelerated test and the duplicate samples of glass which were exposed to the sun is too small to take into consideration, and that, moreover, all the various makes of glass are comparable on the same basis whether by accelerated aging with the mercury arc and the carbon arc or by solarization by exposure to sunlight when the latter is sufficiently prolonged. A "correction factor" is used in determining the minimum transmission for sunlight on the basis of the accelerated tests. Attention is called to the rapid improvement in these new glasses.

BIOLOGICAL VALUE

The antirachitic value of these glasses is a function of:

(a) The transmissibility of the glass.

(b) A source or locality (in the case of sunlight) having sufficient ultra-violet to prevent rickets.

In the case of sunlight the minimum transmission permissible will depend upon the altitude and latitude of the given location. Evidently the most transparent glass available will be required in the northern latitudes, where the activating rays are of low intensity, while in locations where sunlight is abundant a glass having a lower transmission factor may prove satisfactory. This conclusion is based upon the report issued by the Council on Physical Therapy of the American Medical Association (3), which shows that only those glasses which had a transmission of 30%, or higher, at 302 mμ gave an appreciable protection against rickets, but that this protection was not 100%.

Reports on the antirachitic efficiency of solar radiation in northern latitudes through various samples of ultra-violet transmitting glasses (4, 5, 6, 7) show that in order to obtain a useful antirachitic effect from sky shine (that is, solar radiation from the sky and clouds) approximately equal to that of the direct rays of the sun, it is necessary to construct a solarium glazed with special glass permeable to ultra-violet radiation and which will admit rays from a large part of the sky; and furthermore (8) that in order to prevent rickets, the animals under test had to be kept directly in the path of the sun's rays if an ordinary window opening glazed with this special glass was used. Those animals that were 1 m. or more from the window, or close to the window, but outside of the path of the sun's rays developed rickets.

The Bureau of Standards report (2) concludes that all evidence available at present indicates that a solarium glazed with special window glass or windows exposed to the direct sunlight are necessary in order to obtain beneficial results in preventing rickets and presumably for general therapeutic purposes, and because of the variability of sunlight, calls the attention to the use of artificial sources, especially the carbon arc and the quartz mercury arc lamp. However, since the shortest ultra-violet rays emitted by these artificial sources of radiation appear to be unsuitable for the activation of foods, etc., it is considered desirable in such cases to cover the arc with a screen which transmits only wave lengths longer than 290 millimicrons; that is to say, the wave lengths which occur in sunlight.

It is evident that further biological research work is needed.

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Van Ojen

STORE FRONTS, HOEK VAN HOLLAND, J. J. P. OUD, ARCHITECT

PERMEABILITY TO HEAT

THERMAL CONDUCTIVITY OF MATERIALS

	K
Cinder concrete	2 to 3
Building gypsum	About 3
Plaster	2 to 5
Building brick	3 to 6
Glass	5 to 6
Limestone	4 to 9
Concrete	6 to 9
Sandstone	8 to 16
Marble	14 to 20
Granite	13 to 28

Table 4 (1)

K—Thermal conductivity in Btu. per hour, sq. foot, and temperature gradient of 1 deg. F. per inch thickness. The lower the conductivity, the greater the insulating values.

HEAT TRANSMISSION

The thermal conductivity can be varied with structure and density in the ratio of two to one, the figures running about 0.1% that of silver, 0.3% that of copper, and 1% to 2% that of iron. Although the conductivity of glass is so far below that of the metals, surface conditions are such that heat transfer through a copper condenser is only two and one-half times that through a condenser of *Pyrex* glass (a special borosilicate glass). In specific heat ordinary glass is near aluminum and about twice iron or copper. The low power of reflecting radiated heat is used with advantage in the construction of baking dishes of special borosilicate glass. The high reflecting power of metal slows down the heating of its content to an extent not compensated by its thinness and high conductivity. Although heating takes place more rapidly, yet cooling takes place more slowly in glass than in metal. Glass conducts heat about one hundredth as fast as metal and the greater thickness of the glass dish also impedes cooling.

The insulating value of glass depends upon its thickness as well as upon the thermal conductivity. In general the insulating value, that is the resistance to the heat flow, is equal to the thickness of a material divided by its thermal conductivity, i.e. the reciprocal of the conductance. For thick walls built of insulating materials the rate of heat transmission will be governed mainly by the absolute conductivity of the material itself, the surface finish being of relatively little importance; but for thin walls built of conducting materials the rate of heat transmission will be governed mainly by the surface transfer. Increase in absolute conductivity, reduction in thickness, or acceleration of the outer surface transfer of heat tends to lower the inside surface temperature of the wall.

THERMAL EXPANSIVITY

The change in volume caused by heating or cooling glass is very small, but important in the use of glass for structural purposes. The thermal expansivity can be made to vary in as high a ratio as six to one. Commercial glasses have linear expansivity ranging from three millionths to eleven millionths, these fractions representing the extent to which the length increases or decreases on heating or cooling one degree centigrade. Where ordinary lime glass expands 10 millionths, copper expands 17, iron 12, and platinum 9, this being also the figure for certain lead glasses which are readily sealed to platinum. For special borosilicate glasses (*Pyrex* glasses) the value is around three. Quartz glass, which is amorphous silica, has a linear expansivity of less than one millionth and can be heated and plunged into cold water without breaking.

HEAT ABSORPTION

Recent experiments with new glass compositions (2) have demonstrated the possibility of making a heat absorbing glass of low thermal expansion capable of withstanding a considerable heat shock. This heat-resisting, heat-absorbing glass, has been employed in projection apparatus to remove the invisible heat radiation. It is sold under the trade mark AKLO (*Corning Glass Works, Corning, N. Y.*). The desired heat transmission or light transmission, as the case may be, can be secured with a thin piece of a dense glass or a thick piece of a dilute glass. The latter has in general a better light transmission for a given heat transmission than does a thinner piece of a denser glass.

INSULATING VALUE

The heat transfer through a single window is usually more than twice that of a double window (3).

Vacuum panes now being developed in Europe and structural units of vacuum type (up to 90% vacuum) possess the insulating value of vacuum bottles and reduce condensation. Walls and windows of structural glass units eliminate infiltration.

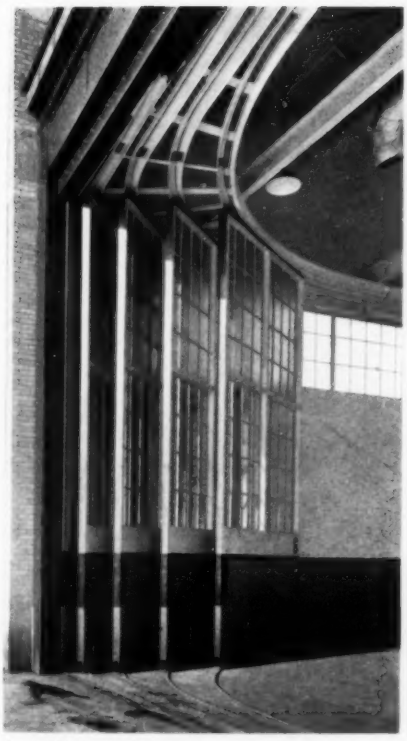
H. Collischon

APARTMENT HOUSE, FRANKFURT, FRANZ ROECKLE, ARCHITECT

FIRE RESISTANT CONSTRUCTIONS

Steel wire netting incorporated in glass of ¼" thickness and over afford fire protection (resistance to passage of flames and the cooling and impact of fire streams) by holding the glass in the sash after it has been cracked from the heat. The degree of protection furnished by a wired glass window is naturally limited to the fusing point of the glass. Fire records show, however, that under ordinary conditions where the exposure is not especially severe such windows are effective fire stops (4). One-quarter inch wired glass for fire protection must not exceed 720 sq. in. exposed area or 54" vertical and 48" horizontal dimensions to conform to the rules of the National Board of Fire Underwriters. (Class E openings.)

Constructions of glass prisms placed in metal frames or reinforced concrete frames with an elastic compound to allow for expansion and walls of reinforced glass blocks are effective fire stops. Fireproof glass windows, walls and partitions used in Europe ("Luxfer" Electro and "Solfac" Galvano glass) consist of 10 x 10 cm. prismatic crystal glasses fastened electrolytically in copper frames. The profile and strength of the frame depends on the type of glass used. Great areas are divided by metal or reinforced concrete frames. Expansion joints are provided when the glass is placed in the frames. These constructions can also be used for roof lights.



Courtesy Truscon Steel Co.

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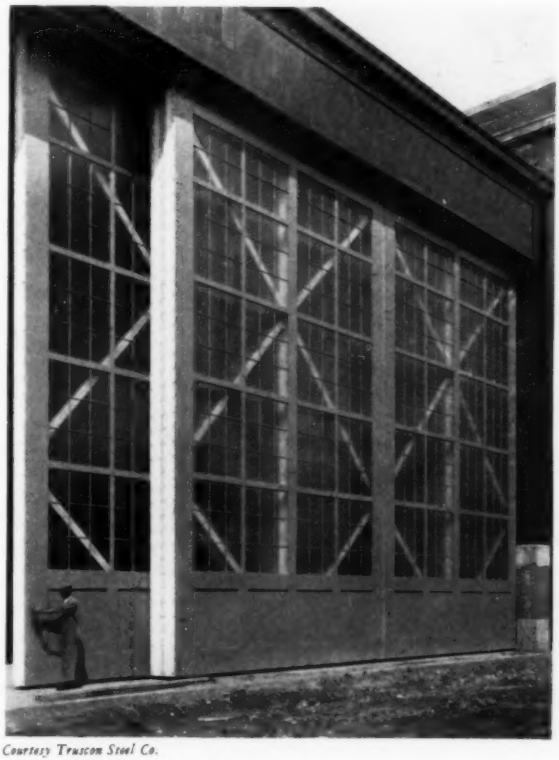
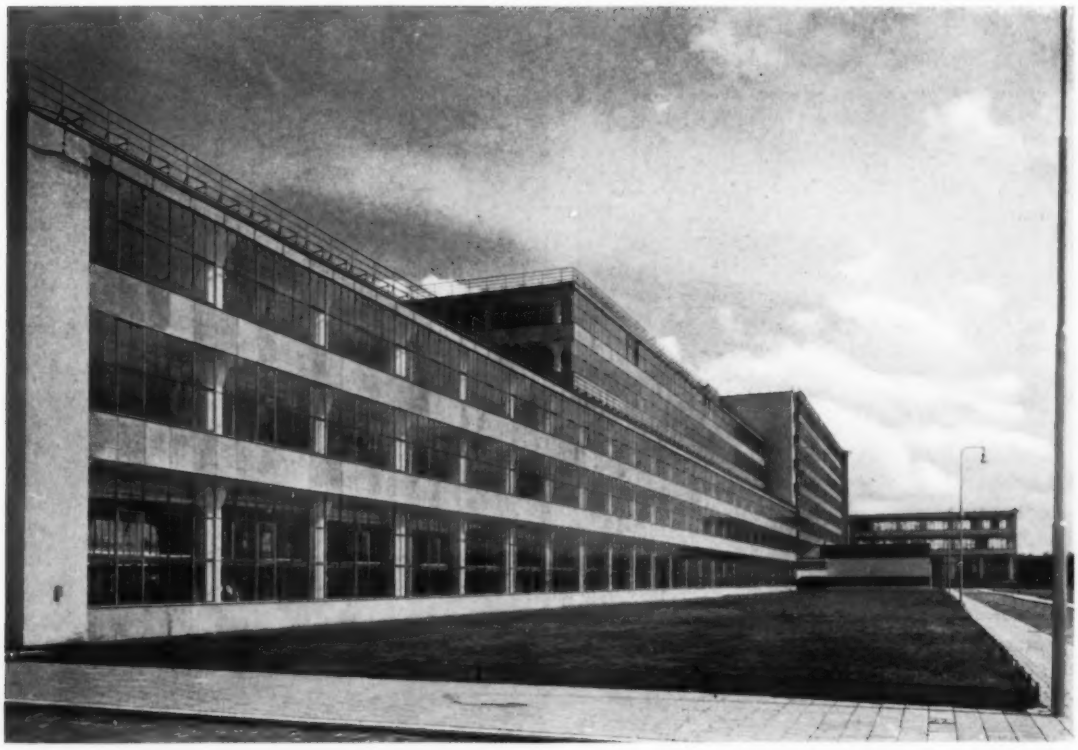


Courtesy Truscon Steel Co.

SLIDING STEEL HANGAR DOORS

Kamman



VAN NELLE TOBACCO FACTORY, ROTTERDAM, BRINKMAN AND VAN DER VLUGT, ARCHITECTS

ACOUSTICAL PROPERTIES*

1. ABSORPTION OF SOUND

As an absorbent of sound, glass is among the lowest rated materials, due to its smooth surface. The value of its absorption is generally taken at 1½% as compared with 3% for hard gypsum plaster on metal lath and 6% for lime plaster on wooden lath. In very large sheets it would undoubtedly vibrate as a diaphragm under the impact of sound and would have absorption values in excess of 1½% at various frequencies, corresponding to its natural period of vibration and various harmonics thereof. Values on the sound absorption coefficient of glass vary with different authorities. The value 0.027 at 512 cycles has been secured by both W. C. Sabine and F. R. Watson. Results at other frequencies are unobtainable. The Bureau of Standards gives the following values of absorption coefficient of glass: 0.021 at 297 cycles; 0.020 at 1095 cycles; and 0.010 at 2190 cycles. The Bureau of Standards apparently accepts and uses the value of 0.027 at 512 cycles.

2. TRANSMISSION OF SOUND

Paul E. Sabine, J.A.S.A., January, 1930 (1):

"A door or window may be treated as a single structural unit, and the tests on these constructions show that the reduction factors are determined for the greater part by the weight of such units and also, but to a less degree, by their structural stiffness. Table 5 gives the averaged results for 16 different units (Editor's note: only seven units employing glass are shown). Unless otherwise indicated the units were sealed in tightly in each case so that the values are somewhat higher than would be the case in actual practice, when the sound insulation is decreased by the passage of sound through the cracks at the threshold and sides.

No.	Description	Av. Reduction (db.)	
		128 to 4096	128 to 1024
10	Window, one pane 79"x30", ¼" plate glass	23.0	22.8
11	Window, 4 panes each 15"x39", ¼" plate glass	25.7	25.3
12	Window, 2 panes each 31"x39", 3/16" plate glass	20.1	19.7
13	Same as 12, but double-glazed with glass set in putty on both sides of sash, 1" separation	23.4	23.1
14	Same as No. 13 but with glass set in felt	25.4	24.0
15	Small 3/16" leaded panes	25.0	23.9
16	12 panes 10"x19", ⅜" window glass	21.7	21.2

Table 5. (*Table 1 of P. E. Sabine*).

Reduction factors for single glass panes (1).

"Inspection of the values for the windows suggests that the crossbracing of the sash effects a slight increase in insulation over that afforded by larger unbraced areas of glass. On the whole, it may be said that normal door and window construction can not be expected to give a reduction of more than 25 db."

The above values for the average reduction factors were the averages for a number of standard test tones which included four tones in each octave below 1024 cycles per second, and two tones in each of the two octaves above this frequency, or seventeen tones in all.

In addition to the above data on single thicknesses of glass, the following information on double thicknesses of glass with various air separations are also quoted from the same article by Paul E. Sabine (1).

"This series of tests was conducted with two single-pane ¼" plate glass window, 82" x 34" set in one of the Sound Chamber openings. Spacing frames of 1" poplar, to which ½" saddler's felt was cemented, were used to separate the two windows.

"The separation between the windows was increased by increasing the number of spacing frames. It is evident that the experiments did not show the effect of increased air space alone, since a part of the transfer of sound energy is by way of the connection at the edges. However, the results presented in Table 6 show that the spatial separation between double walls does produce a very appreciable effect in increasing sound insulation."

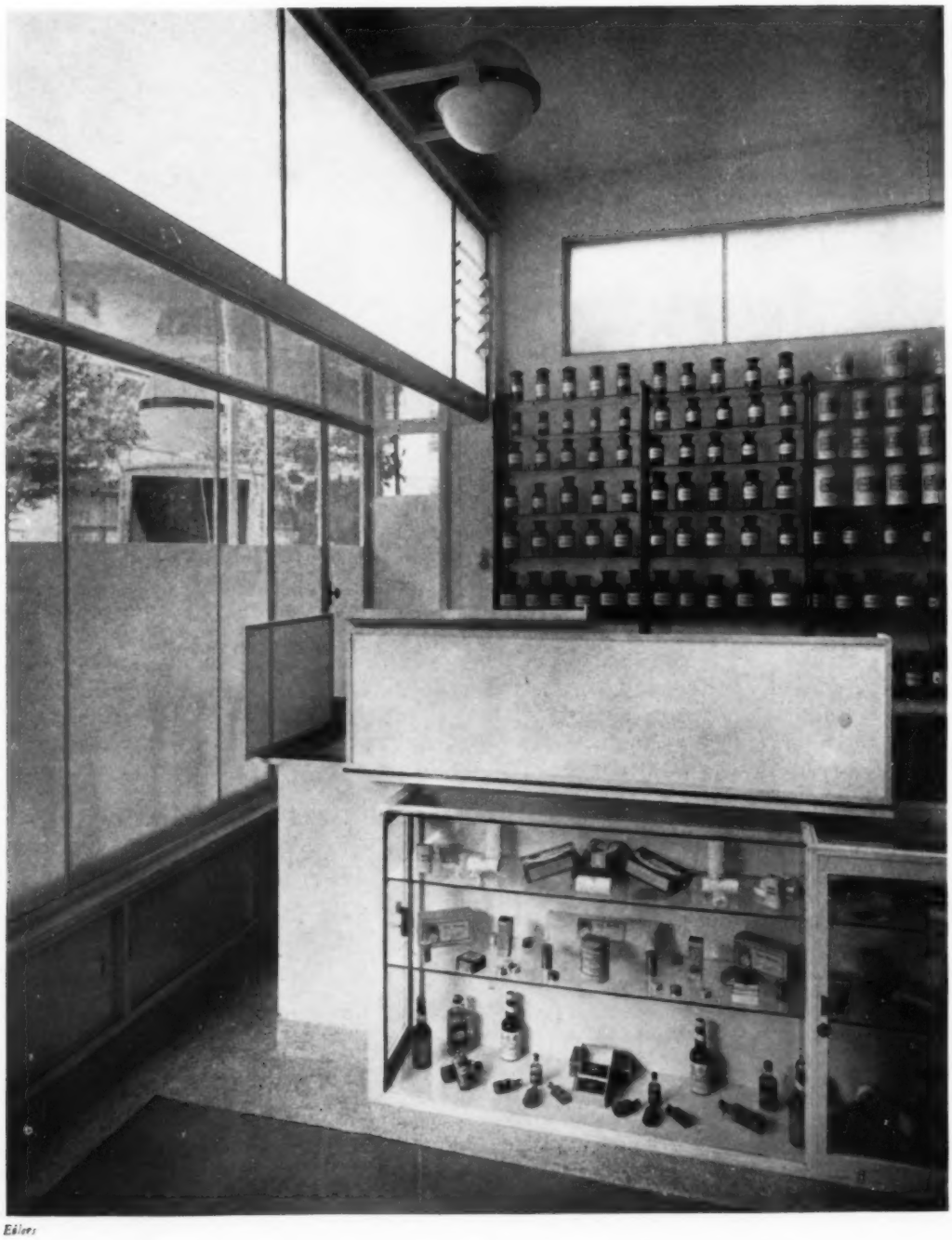
No.	Description	Reduction (db)	Equiv. Masonry
48	Sashes in contact	29.3	1.8"
49	1½" separation	34.0	2.6"
50	4½" separation	35.3	3.0"
51	7½" separation	38.2	4.1"
52	9½" separation	40.7	4.8"
53	13½" separation	42.5	5.5"
54	16" separation	43.0	5.8"

Table 6.

Reduction factors for double glass panes (1).

Transmission of acoustic energy by partitions of wood, glass, steel or masonry, which are impervious, must take place by means of minute vibrations of these structures set up by the alternating pressure of the incident sound. Sound, considered as undulatory motion of the air particles, cannot pass through such barriers. If the natural frequency of the partition is much lower than the frequency of the incident sound, the transmission depends chiefly on the mass of the partition. If the natural frequency is much higher than that of the incident sound, the transmission depends on the stiffness of the partition.

* Compiled for THE ARCHITECTURAL RECORD by G. T. Stanton, Asst. Acoustic Engineer, Electrical Research Products, Inc., New York.



Eilers

DISPENSARY, J. DUIKER, ARCHITECT, HOLLAND

Quoting from F. R. Watson's "Acoustics of Buildings", 1930 (2):

"Experience has shown the following in connection with sound reduction:

"With an average reduction factor of 25 db., normal speech can be understood quite easily and distinctly through the partition.

"With an average reduction factor of 30 db., loud speech can be understood fairly well if conditions are quiet.

"With an average reduction factor of 35 db., loud speech is audible, but not easily intelligible under quiet conditions.

"With an average reduction factor of 40 db., normal speech is not audible, loud speech can be faintly heard, but not easily understood, and for all practical purposes the partition can be considered as 'sound proof'.

"Flexural vibrations play an important part in transmission. Dead air spaces between double windows were not as effective as commonly supposed. The air space should not be bridged over by solid materials even at the edges of the glass. Inserting sound absorber between the glass plates increased the insulation." The results obtained by the Bureau of Standards on transmission tests through glass are quite similar to those obtained by Paul A. Sabine.

No information as to the relative reduction factors of the glazing method used in the monitoring booths of the various film studios could be obtained. This method uses different thicknesses of glass with a constant spatial separation, and is said to be more satisfactory than using glass of the same thickness at the same spacing. This point would appear to be reasonable if the theory of transmission in such impervious structures is correct by providing a mismatch of the air impedance in the various sections. This condition, however, would only be true in the event of true diaphragm action of the glass windows. The presence of diaphragm action is evidenced in Table 5 of Paul E. Sabine, since with small sections of glass rigidly braced greater reduction factors were obtained.

It is to be appreciated that reduction factors as indicated for double windows were not generally the obtainable in practice, since the conditions of the tests were commercially unobtainable. In this particular test, there was no connection between the windows by way of the sashes or surrounding masonry structures since two completely isolated rooms were used.

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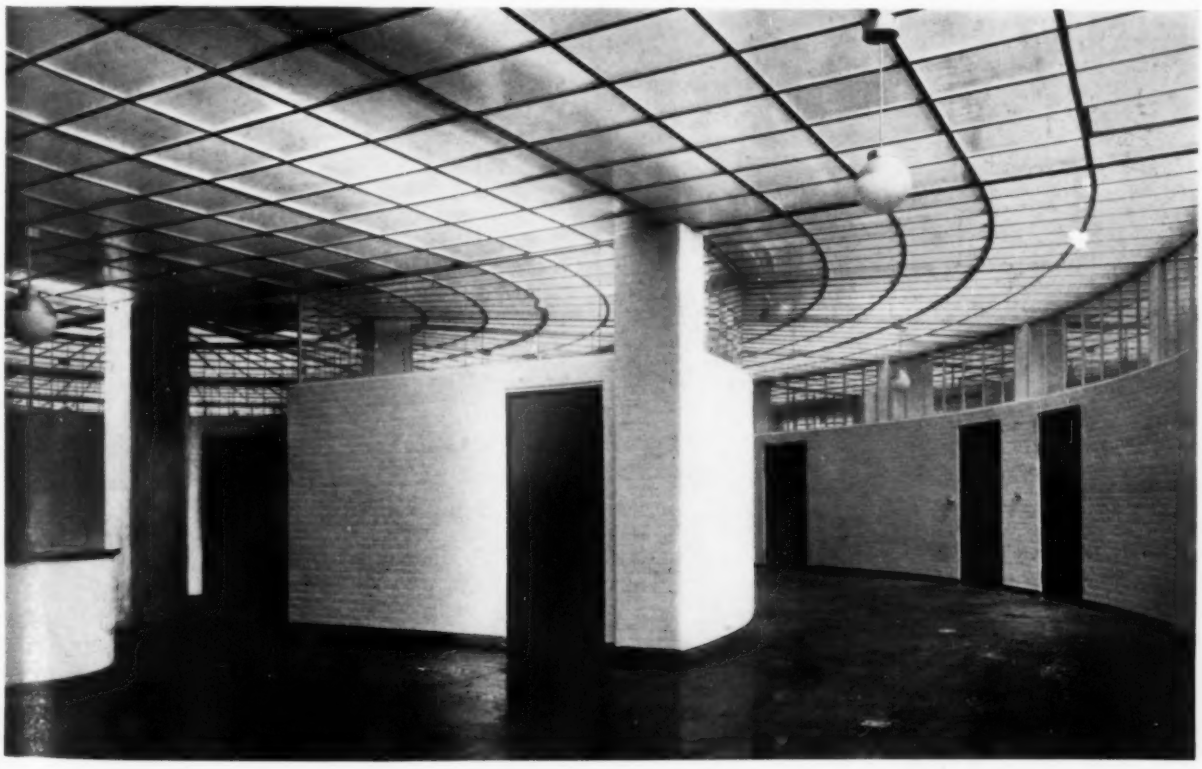

HALLWAYS, ADMINISTRATION BUILDING, DESSAU, WALTER GROPIUS, ARCHITECT

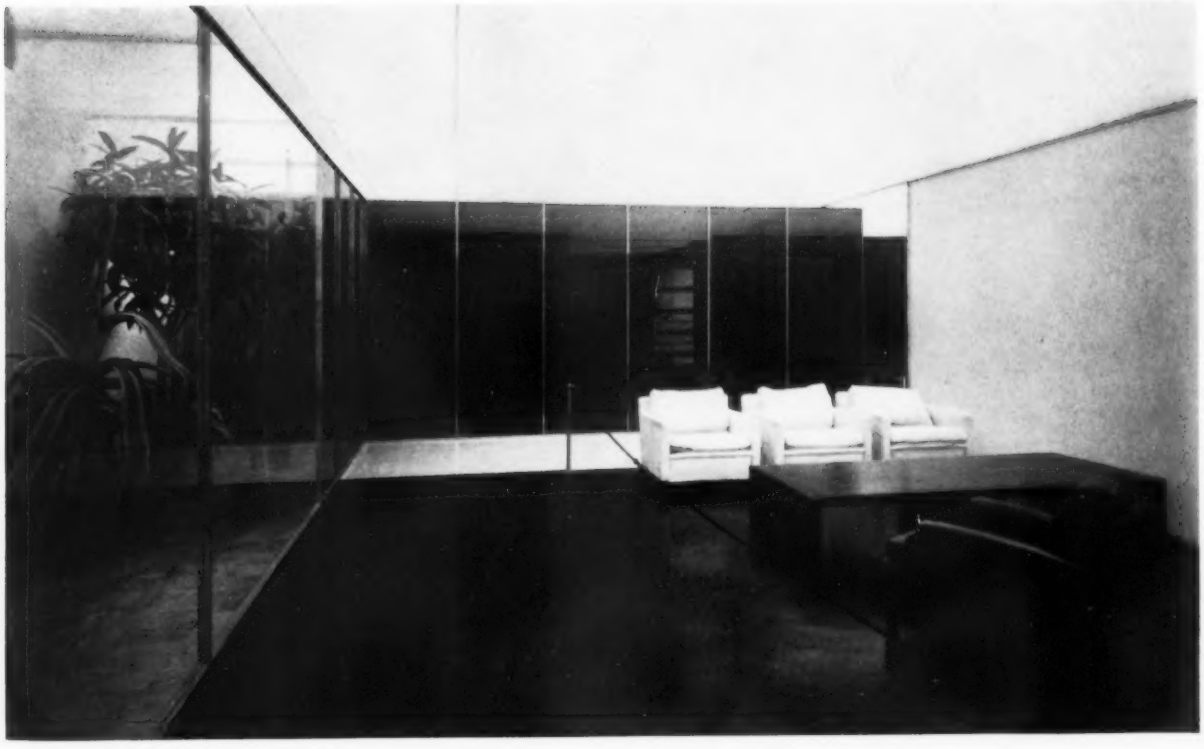

PLATE GLASS PARTITIONS, EXPOSITION STUTTGART, MIES VAN DER ROHE, ARCHITECT

MIES VAN DER ROHE, ARCHITECT

PERMEABILITY TO FLUIDS

The surface of glass is non-porous, does not crack, absorbs no odors, and is impervious to air, gases, water, grease and most acids. Glass will not warp, swell, pull apart or lose its hardness when exposed to moisture. A polished surface will not disintegrate and will retain its luster; it is difficult to mark or write on, and is particularly easy to keep clean. For these reasons clear or colored glass polished or modeled in sheets or in tiles of sufficient structural strength can be used extensively for exterior and interior wall treatment, partitions, toilet stalls, shopfronts, floors, ceilings, mirrors, furniture, signs and lighting equipment. Glass will furthermore meet the criteria for a number of building fixtures.

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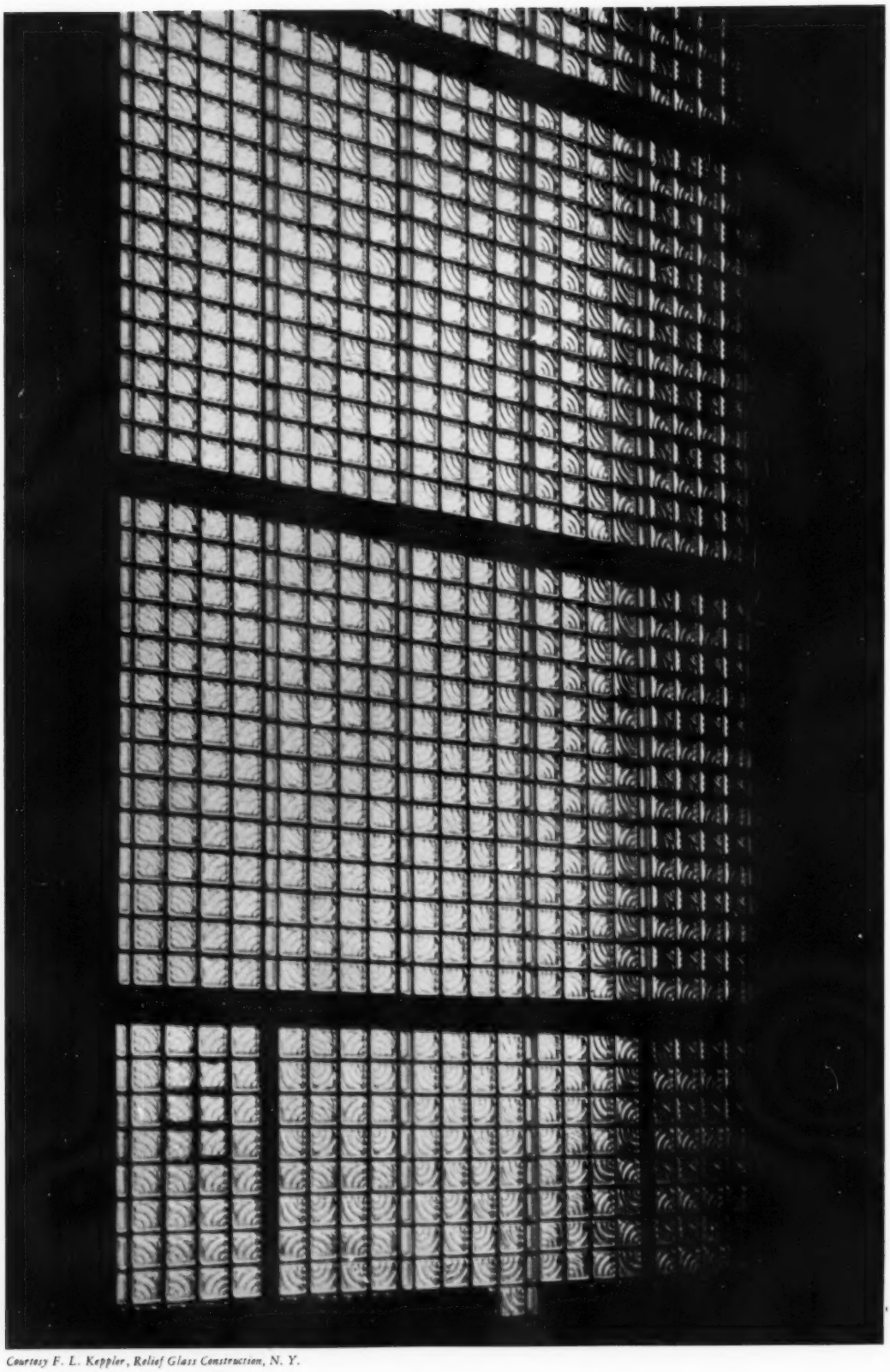


Courtesy F. L. Keppler, Relief Glass Construction, N. Y.

PRISM WINDOW

MECHANICAL PROPERTIES

The mechanical properties depend on composition and dimensions. The specific gravity or density of ordinary lime glass, 2.5, is close to that of metallic aluminum, 2.6. It can be made to vary in a ratio of about three to one, namely from 6.33 to 2.14. The weight of ordinary glass is roughly 2 lbs. for each $\frac{1}{8}$" of thickness.

The hardness of glass, that is, its imperviousness to scratching, can be made to vary in about a two-to-one ratio, the hardest being harder than quartz.

The tensile strength of glass in laboratory measurements ordinarily is about 10,000 lbs. per sq. inch. It is possible to prepare glasses by special heat treatment, the so-called case-hardening process, of tensile strength near that of wrought iron, which is about 50,000 lbs. per sq. inch. The compression strength of glass is greater than that of ordinary structural materials such as granite, concrete or brick. Glass can be worked and shaped and polished to a brilliant surface.

The common causes for fracture are compression, tension, flexure, impact and sudden temperature differences causing internal stresses. Ordinary sheet and plate glass should not be subjected to structural strains; edges in contact with other materials should therefore be cushioned.

Fire-resistant constructions (see PERMEABILITY TO HEAT).

Wired glass

Wired glass has about 1½ times the bending strength as glass of same thickness not wired. The wired-mesh reinforcing causes a loss in light transmission.

Corrugated glass

Corrugated glass, wired or clear, has a higher bending strength than flat glass.

Laminated safety glasses

These glasses consist of two or three thicknesses of plate or drawn sheet glass with one or two layers of a transparent pyroxylin plastic between. The layers are welded into a single piece under heat and great pressure. The adhesion between the glass and the

Courtesy American Window Glass Co.

FIG. 13.

THE LAMINATED GLASS IS CRACKED BY THE ROD AND BY THE IMPACT OF THE STEEL BALL BUT DOES NOT SCATTER

PRISM
6⅜" x 10¼" x 1"

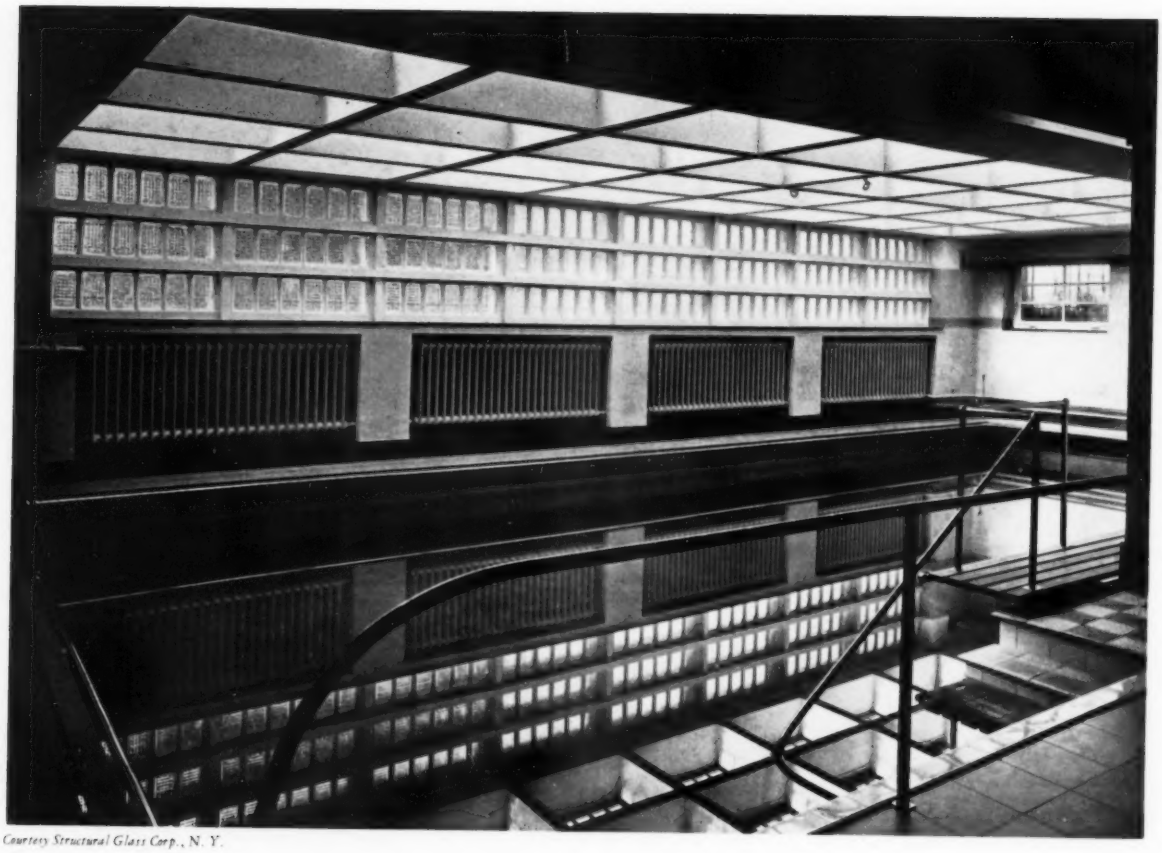
PRISM
6⅜" x 6⅜" x 1"

PRISM
8¼" x 8¼" x 1"

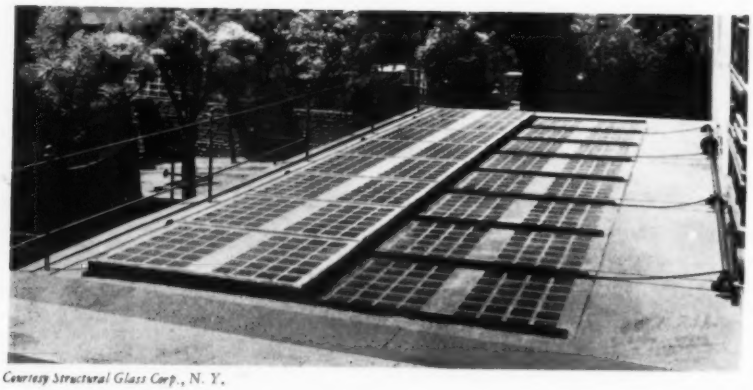
PRISM
4⅞" x 4⅞" x 1"

TILE
6" x 6" x 2"

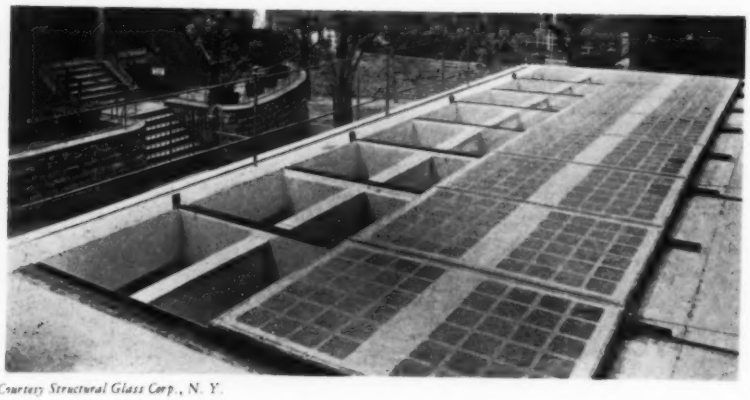
Courtesy Structural Glass Corp., New York



Courtesy Structural Glass Corp., N. Y.



Courtesy Structural Glass Corp., N. Y.



Courtesy Structural Glass Corp., N. Y.

SWIMMING POOL WITH SLIDING ROOF

plastic is so complete that the glass will not separate from the plastic when it is broken. (Fig. 13). In its finished form this glass can be cut only with special tools. Laminated glass does not impair visibility. It is manufactured in various thicknesses, from light scatter-proof glass to heavy 1″ thick bullet-proof glass.

Prismatic units

The combination of glass prisms and slender reinforced concrete ribs makes the glass an integral part of the construction. All metal members are imbedded in concrete, and there is no risk of corrosion. The panels seldom exceed 35 to 40 square feet; they can be made in the plant or built on the job. Expansion joints should be provided around the panels. The design of the prisms should insure a minimum loss in light transmission (Fig. 14), a minimum strain on the flanges, and easy exchange of broken units. Ventilation units in bronze frames can be placed in these constructions. In addition to light-transmitting properties, these relatively light constructions usually are fire-proof and sound-proof. Heat-insulating value varies; air infiltration is eliminated. Maintenance cost is minimal.

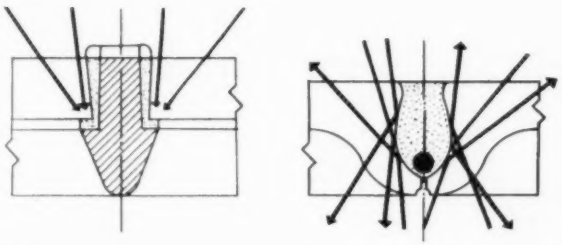


FIG. 14.

THE CONSTRUCTION AT RIGHT TRANSMITS PART OF THE LIGHT WHICH IS STOPPED BY THE METAL MUNTIN IN THE CONSTRUCTION AT LEFT.

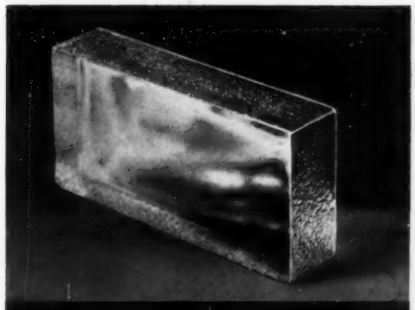
Glass bricks

Panels of hollow, vacuum or solid glass bricks or blocks of various compositions and colors are constructed without reinforcing members. The glass is clear or wired. The bricks are laid in cement-mortar with lime added for pliability. The hollow bricks should be designed to insure a minimum loss in light transmission in the hollow or through reflection. Broken units should be exchangeable. The panel sizes average the sizes given above. Reinforced blocks have high fire-resisting qualities. The cost of these panel constructions (prisms and blocks) varies with the type of glass from $2.30 to $3.40 per square foot installed.

REFERENCES

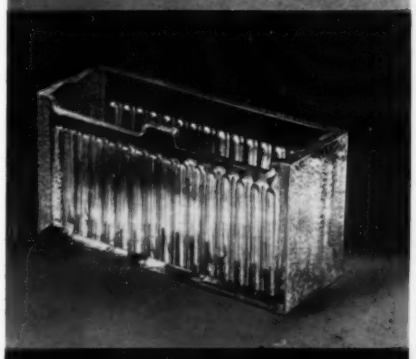
Glas in der Architectur der Gegenwart, by K. W. Schulze, Wissenschaftlicher Verlag Dr. Zaugg & Co., Stuttgart, 1929.

Glass Industry, published monthly by Glass Industry Publishing Co., New York.



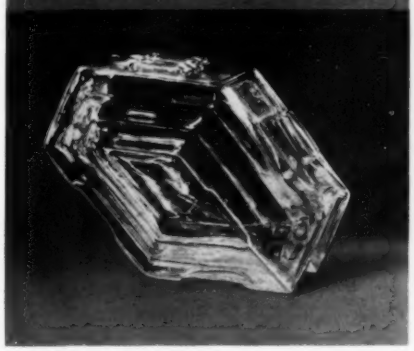
SOLID BRICK
10″ x 5″ x 2½″

HOLLOW BLOCK
9¼″ x 4½″ x 3″



HOLLOW BLOCK
9½″ x 4½″ x 3″

VACUUM BLOCK
9¾″ x 5″ x 2½″



VACUUM BLOCK
7¾″ x 5½″ x 3″

Courtesy Structural Glass Corp., N. Y.

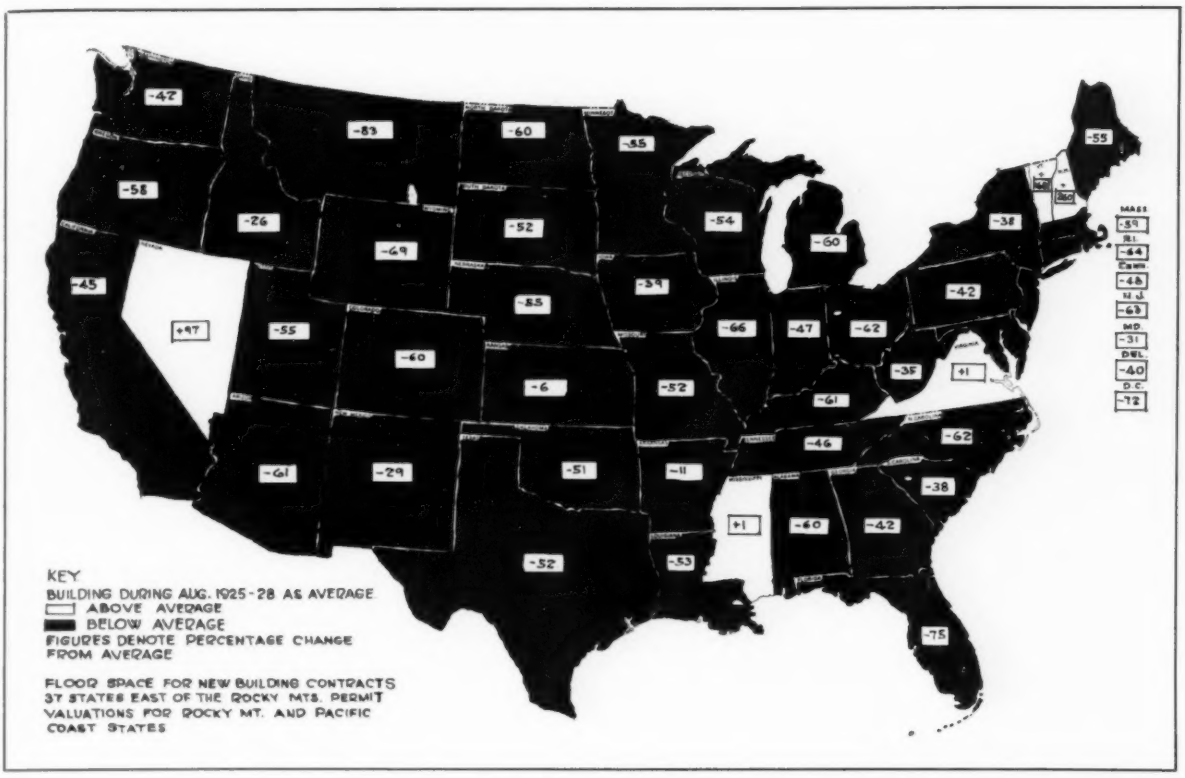
Der Baumeister

GLASS BLOCK WALLS, AIRPLANE HANGAR, MUNICH

K. J. MOSSNER ARCHITECT

Courtesy Structural Glass Corp., N. Y.

ROOF LIGHTS



The volume of building for August, 1930, showed only five states where current new volume was greater than average (August, 1925-1928): New Hampshire, Vermont, Virginia, Mississippi and Nevada. Of these Virginia and Nevada consolidated their July gains. Other states showing gains in July failed to carry through in August.

BUILDING TRENDS AND OUTLOOK

PROSPECTS FOR NON-RESIDENTIAL CONSTRUCTION

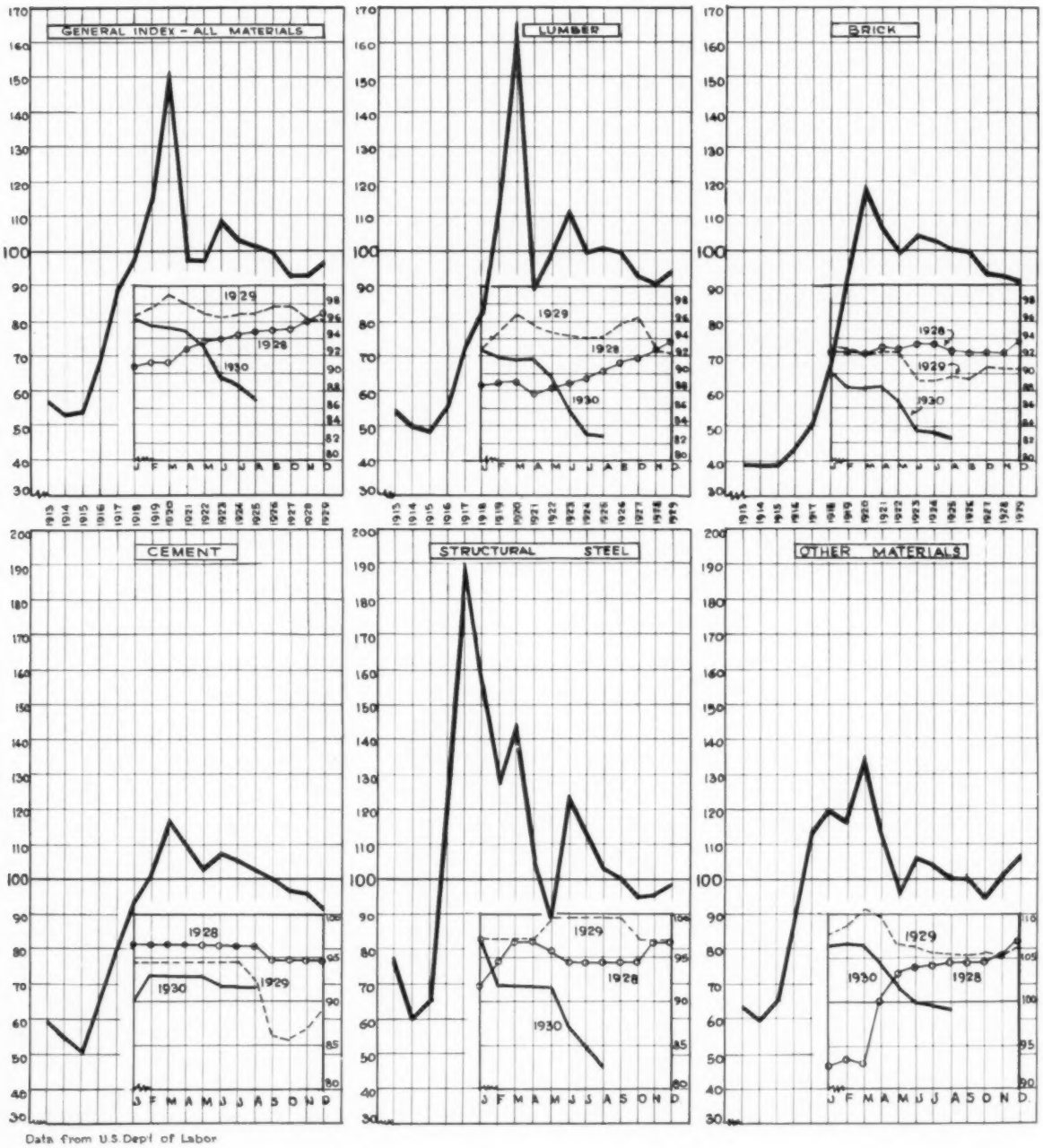
Non-residential building is normally a concomitant and not an important moving cause of large general construction activity. Nor is non-residential building a maker of business prosperity. It is rather a symptom or a result. This is especially true with respect to industrial building which usually accounts for about one-fourth of all non-residential building. In each of the four years of relatively large industrial activity since the war (1920, 1923, 1926 and 1929) this type of construction accounted for more than 25 per cent of the total, ranging from almost 42 per cent in the hectic year, 1920, down to 26½ per cent for 1929. In the recent depression years (1921, 1924, and 1927) industrial building ranged from 19½ per cent of the total in 1924 to only 17 per cent in 1921. It is here of large importance to note that new industrial construction has been, in the past, most often undertaken at or near the crest of large industrial activity, even in the face of our much vaunted improvement in industrial management.

To somewhat the same extent what is true for industrial building has held for commercial building, which usually accounts for more than one-third of all non-residential building. Commercial building, however, has been more readily activated by economic conditions and factors of obsolescence than has industrial building. Together these two branches of non-residential construction, for the years from 1919 through 1929, have accounted for about 60 per cent of all non-residential building; the remainder included educational buildings, hospitals and institutions, public buildings, religious and memorial, and social and recreational structures. Of these, educational buildings have been of most importance, and public buildings of least importance. New educational buildings undertaken in the last eleven years have represented 17 per cent of all non-residential building while public buildings have accounted for only about 3 per cent of the total.

(Continued on page 92, Advertising Section.)

WHOLESALE PRICES FOR BUILDING MATERIALS

(1926 monthly average=100)



Data from U.S. Dept of Labor

The general index of building material prices continued its downward trend through August and the early weeks of September while the general commodity index showed some signs of strength, almost entirely due to higher prices for farm products and foods and largely reflective of the effects of the recent drought. Despite these opposite trends prices for building materials were still on a higher plane than general prices, a condition which has lasted for almost two years, in the face of a drastic curtailment in building. There are evidences that discounts under existing union scales in the building trades have been accepted in certain localities; while increased efficiency on the part of building tradesmen, usually manifested in times of slack employment, has operated to produce measurably lower unit construction costs.

Can you say as much for the paint you specify?

BROADLAWNS, *Polk County Public Hospital, Des Moines, Ia.*

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U. S. Gutta Percha Paint Co., 22 J Dudley Street, Providence, R. I. Branches or distributors in principal cities.

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Polk County Public Hospital
TUBERCULOSIS DEPARTMENT
GENERAL DEPARTMENT
CONTAGIOUS DEPARTMENT

May 1, 1929

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Providence, Rhode Island.

Gentlemen:-

Two and one-half years ago we painted the interior of the new Southwest wing of Broadlawns Tuberculosis Department of Broadlawns Polk County Public Hospital, with Barreled Sunlight.

The work was done by our own painter following the directions laid down by you. The result was a beautiful job of [illegible] and thus far, when washed, the paint has stood all the appearance [illegible] to use Barreled Sunlight, which after one year seems to be in excellent condition."

BROADLAWNS HOSPITAL SAYS:

". . . a beautiful job of interior decoration . . . has stood up very well . . . when washed, and it is easy to wash, it retains all the appearance of new paint.

"We have also repainted the outside of the Tuberculosis Hospital with Outside Barreled Sunlight, which after one year seems to be in excellent condition."

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Reg. U. S. Pat. Off.

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22 J Dudley Street, Providence, R. I.

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(Check) ☐ Your booklet "The Whitest White House in Town" (Outside Barreled Sunlight).
☐ Your booklet "Information for Architects" (Interior Barreled Sunlight).

Name_____

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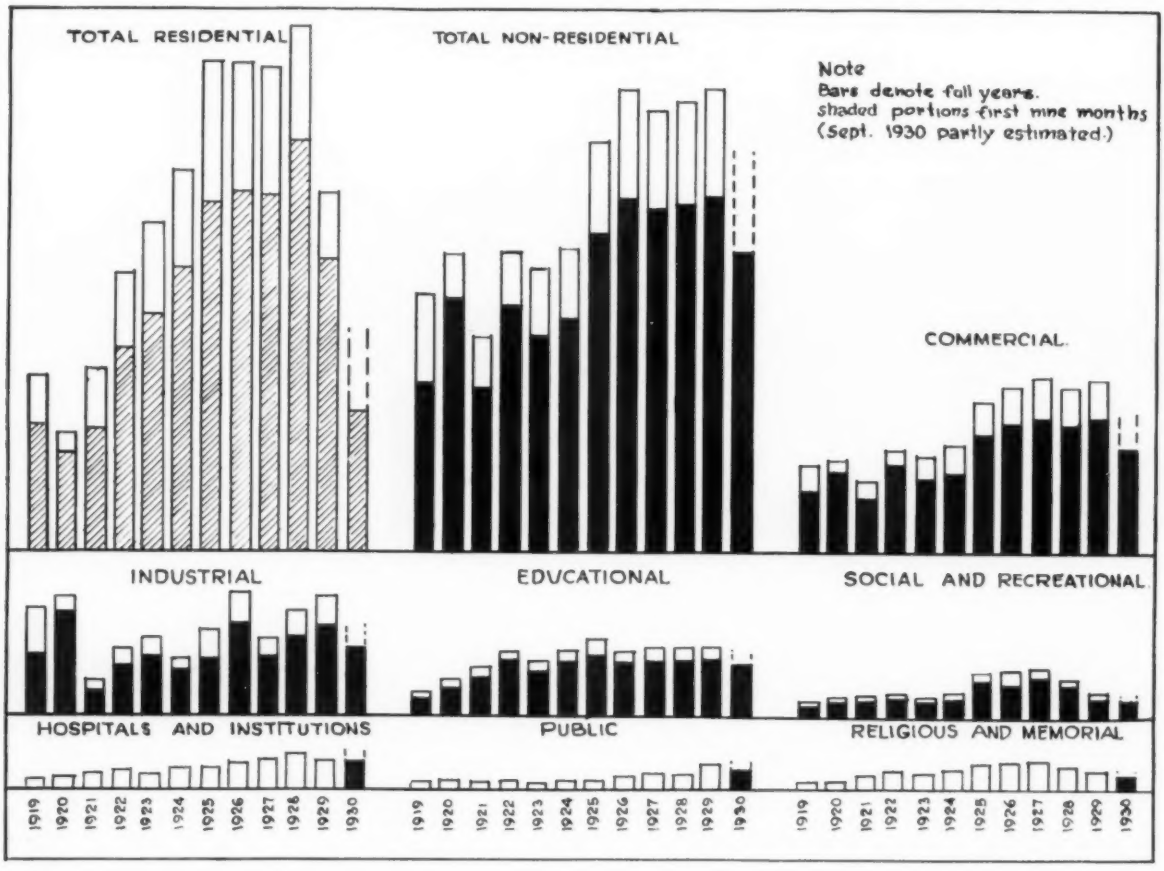
NON-RESIDENTIAL BUILDING IN 27 NORTHEASTERN STATES, BY TYPES
(A Comparison with Residential Building)
1919 — 1930



(Continued from page 359, Editorial Section.)

From the record covering more than a decade it may be inferred that the construction of hospitals and institutions, religious and memorial buildings, and social and recreational buildings, which in the aggregate accounted for only 20 per cent of all non-residential building, has moved pretty much independent of purely economic considerations. Each type seems, however, to have had a cycle of its own which may have been due to activity largely occasioned by donations of various descriptions, the receipt of which, in some measure, has depended upon good business conditions. To a lesser degree, large activity in educational building, has rested also upon contributions though here the growing needs have been largely taken care of by governmental expenditures, either through taxes or bond issues, each reflective of existing general business conditions.

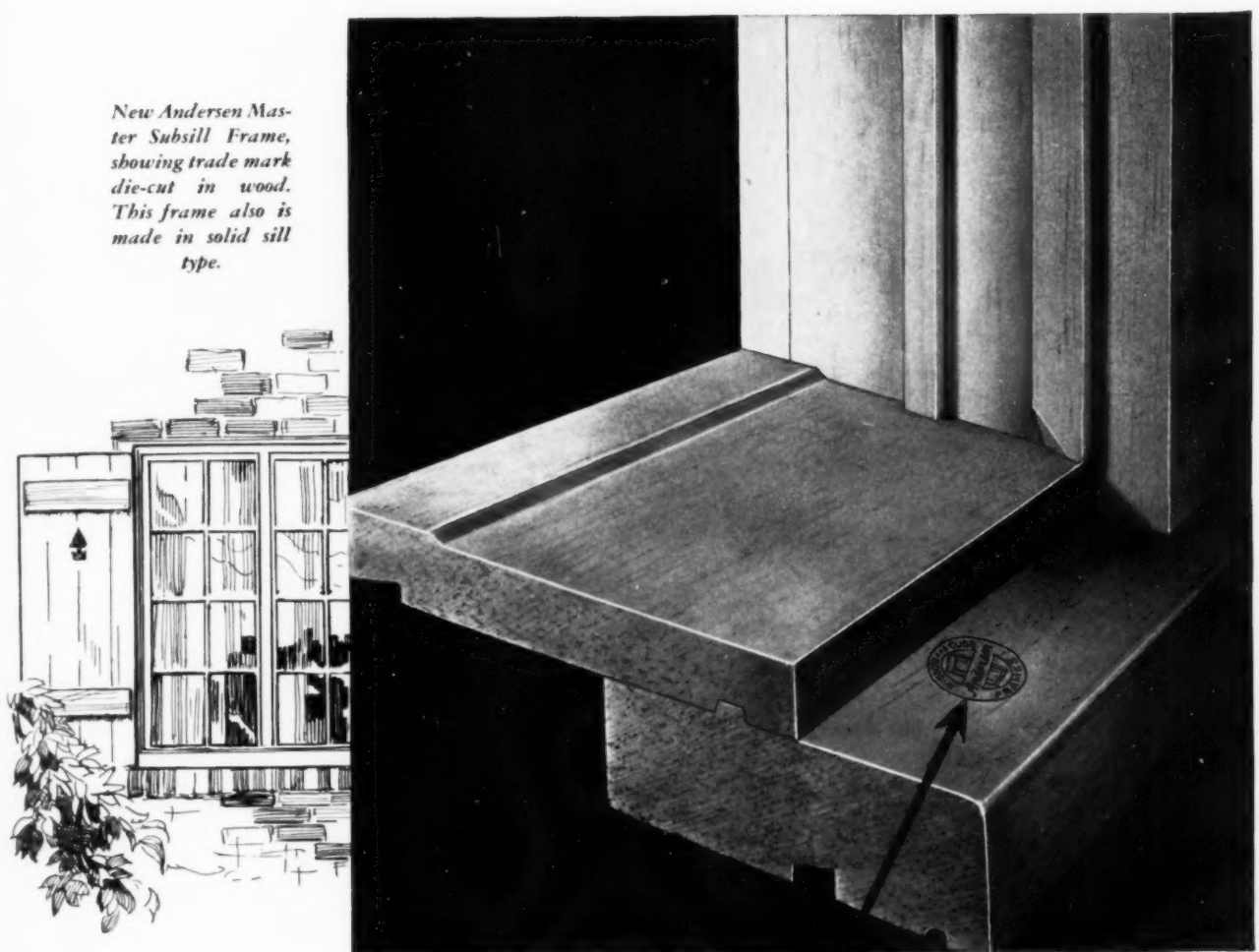
The volume of educational building undertaken in 1930 will approximate conditions of 1924; hospitals and institutions will almost surely exceed 1928, the last previous high year, the total for the first nine months practically equaling the entire year 1929; religious and memorial buildings should just about equal the 1929 total, itself lower than any previous year since 1923; while social and recreational buildings will likely fall to the 1924 level. It is of interest to note that these two latter types of building activity showed continuous expansion throughout the years 1919 to 1927 but for unimportant setbacks in 1923; that for the peak year 1927, each was about three times as large as in 1919; and that since 1927 each has moved downwards to a point where the relative declines are now substantial. Together these two types for the years 1926 and 1927 were more important than educational building and for 1927 about as important as industrial building.

For the first nine months of 1930 industrial building, on a total non-residential volume considerably below 1929, showed a ratio to total of 25 per cent—an experience essentially different from that of the three recent previous depression years. That there has been no appreciable change in the relative importance of industrial construction from what has been usual in periods of large general industrial activity may have been due to the same sort of stimulation here which has influenced the construction of public works and utilities, though this latter class of construction has perhaps been faced with a more genuine current demand than has either residential or non-residential building.

In last month's review it was pointed out that no real improvement in general construction may be expected unless revival takes place in residential building. It is very likely that the current depression in residential building will not deepen since the cumula-

Proud buildings deserve this new Frame with locked sill-joint

New Andersen Master Subsill Frame, showing trade mark die-cut in wood. This frame also is made in solid sill type.



TODAY the architect knows that the New Andersen Master Frame assures him custom frame quality plus a fine accuracy in construction which makes the frame adaptable to his special details.

That is why so many leading architects now specify "Andersen." » » » » » » » » »

Note these features: genuine white pine, new locked sill joint, steep sill slope, adequate wide blind stop provision, guaranteed noiseless pulleys, a type and size for every need. More than 9,000,000 Andersen Frames are in service today, and the new Master Frame is the crowning achievement of 25 years of fine frame building. » » » » » » » »

ANDERSEN FRAME CORPORATION, Bayport, Minnesota, has national distribution through 3,500 leading jobbers and dealers.

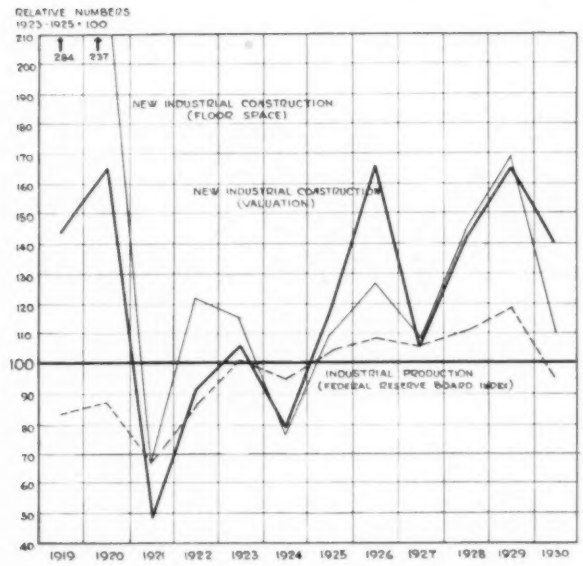
Andersen MASTER WINDOW and DOOR Andersen FRAMES **Frames**

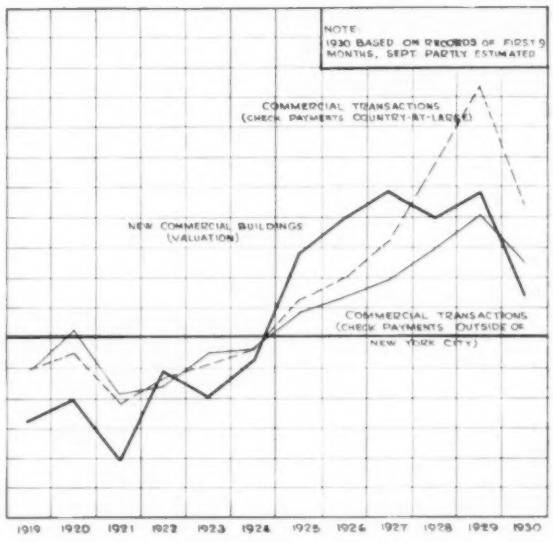
FOR WEATHERTIGHT INSTALLATIONS—USE ANDERSEN SPECIFICATIONS

INDUSTRIAL AND COMMERCIAL BUILDING IN 27 NORTHEASTERN STATES

(A Comparison with Industrial and Commercial Activity)

1919 — 1930


RELATIVE NUMBERS
1923-1925 = 100
284
237
NEW INDUSTRIAL CONSTRUCTION (FLOOR SPACE)
NEW INDUSTRIAL CONSTRUCTION (VALUATION)
INDUSTRIAL PRODUCTION (FEDERAL RESERVE BOARD INDEX)
1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930


NOTE
1930 BASED ON RECORDS OF FIRST 9 MONTHS, SEPT. PARTLY ESTIMATED
COMMERCIAL TRANSACTIONS (CHECK PAYMENTS COUNTRY-BY-LARGE)
NEW COMMERCIAL BUILDINGS (VALUATION)
COMMERCIAL TRANSACTIONS (CHECK PAYMENTS OUTSIDE OF NEW YORK CITY)
1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930

tive relative declines from 1929 for the last three months ended August have been virtually stationary at something under 50 per cent below last year. For non-residential building there still seems to be further recession in sight in the light of the progressive relative declines recorded in the past three months; at the end of August non-residential building was 16 per cent behind the corresponding eight-month total ended August, 1929, at the end of July the decline was 13 per cent, while at mid-year non-residential building was off only 8 per cent. It is therefore highly probable that the remaining months of 1930 may show still further accumulated declines from 1929 as the year draws to a close because the more important types, commercial and industrial, remained at relatively high levels throughout the closing months of 1929. Residential building, on the other hand, is more likely to show better comparisons with 1929 from now on because of the drastic curtailment in this branch during the closing quarter of last year.

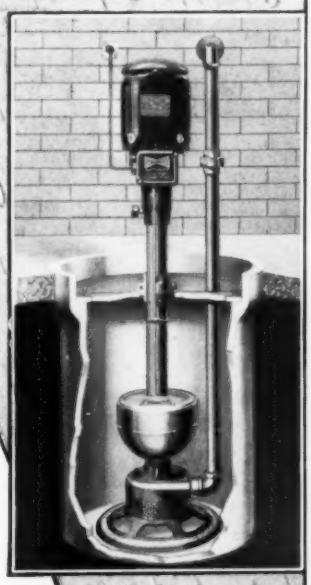
Commercial building, with unimportant deviations in 1923 and 1928 showed relatively the same general movements indicated for commercial transactions (check payments) throughout the period from 1919 to 1929, inclusive, except that for the first half of this period commercial building was on a lower plane than commercial transactions while in the latter half it was distinctly above. That there has been some commercial building in the past few years in excess of actual demand may, it seems, be reasonably inferred from this comparison, though, of course, factors of rising land values, obsolescence, and replacement have contributed largely to swell activity in commercial building. On a relative basis it would also appear that new industrial construction—at least during the five years ended 1929—has been expanded beyond demands of increased industrial activity as measured by the industrial production index of the Federal Reserve Board. In the period from 1921 through 1924 the two movements were in striking agreement, while in 1919 and 1920 industrial construction was far in excess of industrial output just as was the case in 1928 and 1929 and still seems to be the case for 1930.

That wholesale prices for building materials continued downward throughout August and into September in the face of a rising general commodity level due almost entirely to stronger prices for farm products and foods emphasizes the current depression in the construction industries. The general index of building materials is still above the general commodity level. Reports have accumulated to indicate that actual wages under existing union scales in the building trades have been accepted in certain localities; while increased efficiency on the part of building artisans, usually noted in times of slack employment, has operated to lower unit construction costs.

It would appear unlikely that lowered building costs can alone provide a basis for revival in building activity. Space occupancy can no more be doubled by a halving of unit rental costs than can the consumption of meat be increased 100 per cent by a 50 per cent reduction in price, though the demand for food is, to be sure, somewhat more inelastic. Any genuine impetus must come from a closer gearing of supply to demand. In the field of residential building much of "the rough road" has already been traveled but in the principal branches of non-residential building it would appear from the record for 1930 that this movement has only lately begun. Though we speak of easy money, in reality money for the building of projects other than essential is virtually non-existent; especially is this true since lending institutions are known to be tending towards increased conservatism in their desires to appraise better the all-important relationship of supply and demand.

L. Seth Schnitman

when it RAINS *and* RAINS *and* RAINS



Penberthy Automatic Electric Sump Pump

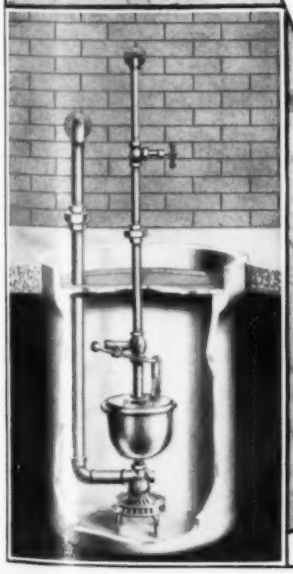
A Dry Basement

ALTHOUGH this home was built in a new subdivision that is without sewerage facilities, its owner will never be troubled with a wet basement, no matter how hard or how long it rains. The architect had it equipped with a Penberthy Pump that handles all basement seepage and drainage quickly and quietly.

Both the electric and water operated pumps are immune to corrosion . . . they are copper and bronze throughout. Both are automatic and thoroughly dependable under the most severe operating conditions; they are economical of electricity and water power. Both have a minimum space requirement and are easy to install.

Penberthy Pumps are quickly available from the stocks of leading jobbers throughout the country.

Penberthy Automatic Cellar Drainer (Water Operated)



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REVIEWS OF NEW BOOKS

ESTIMATING CONSTRUCTION COSTS. G. Underwood. *McGraw-Hill Co.*, N. Y., 1930; 620 pp. $6.00.

APPRAISERS AND ASSESSORS MANUAL. Prouty, Collins and Prouty. *McGraw-Hill Co.*, N. Y., 1930; 500 pp. $5.00.

NEW BUILDING ESTIMATORS' HANDBOOK. William Arthur. *Scientific Book Corp.*, N. Y., 1930; 1024 pp. $6.00.

These books are all put forth to make estimating easy. Quantity surveying methods and means of computing construction costs are indicated. The first volume contains good charts for rapidly estimating labor time charges on various methods of construction. The second book is primarily for taxation purposes, but offers assistance to the architect and engineer: various building types are analyzed. The third book is a revised edition of an older work.

INSPECTOR'S POCKET BOOK. Austin T. Byrne, revised by S. T. Goldsmith. 244 pp.

A handbook for building inspectors, printed in offset from typewritten sheets. Material is presented in condensed, outline form.

PERSPECTIVE PROJECTION. E. I. Freese. *Pencil Points Press*, N. Y., 1930; 43 pp.; 10 plates.

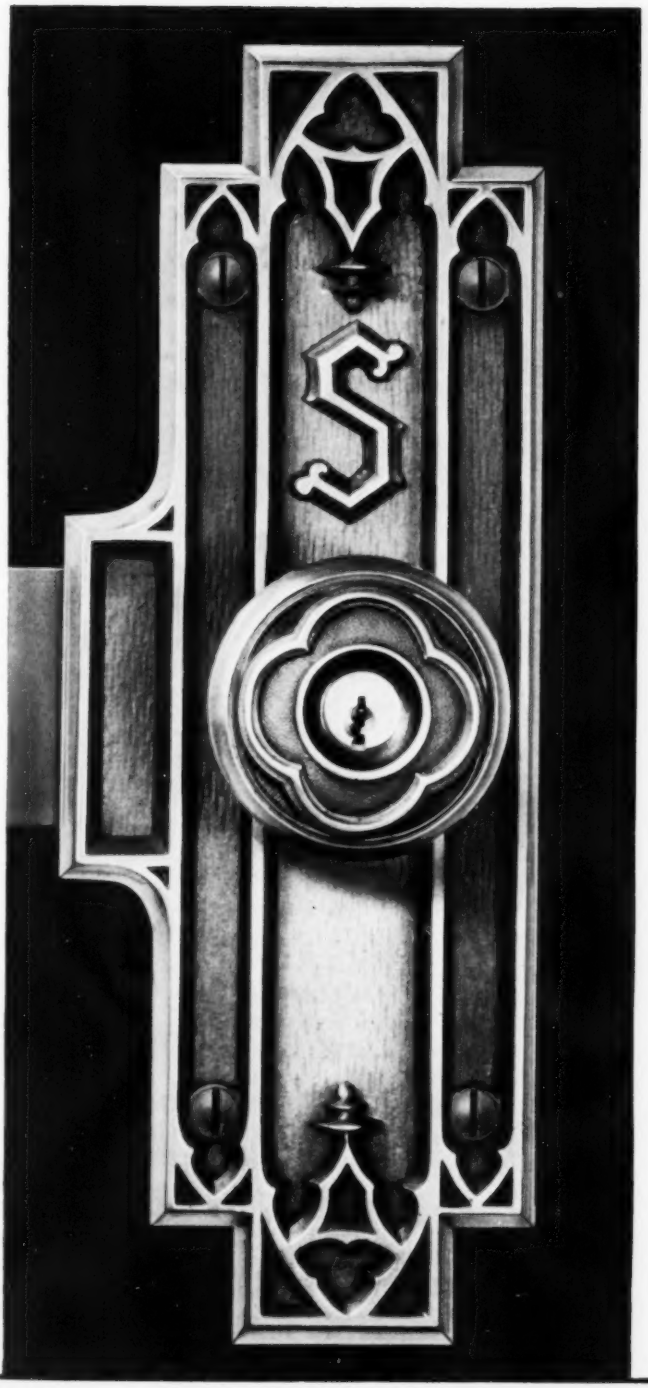
This is another of the large group of handbooks that indicate methods of drawing buildings and other objects with horizontal vanishing points. Perspective is not applied to vertical lines as in reality nor is isometric drawing, a far more convincing method of indication, given a single page of comment or illustration. However, simple methods of projection, minimizing drafting, are given ample discussion.

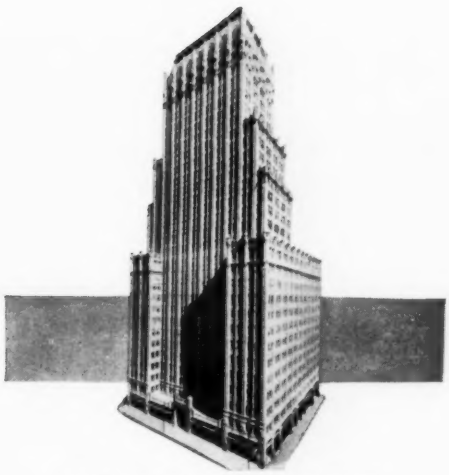
PROMOTING NEW HOTELS. W. I. Hamilton. *Harper and Brothers*, N. Y., 1930; 158 pp. $2.50.

This book discusses, first, *why* (under what conditions) a new hotel building may fail to succeed financially and for good of a community; and second, *how* to plan a community's hotel development along sound and stable lines. Topics such as, Launching the Typical Community Hotel Project, Securing Business and Common Pitfalls, are covered. The book is not exhaustive in its treatment but worthwhile condensed data are offered.

ENGLISH MONASTERIES IN THE MIDDLE AGES. R. Liddesdale Palmer. *Richard R. Smith Publishing House*, N. Y., 1930; 233 pp. $8.00.

A scholarly work presenting an outline of the origins and customs of the monastic orders. Cloisters, churches, extra-claustral buildings are illustrated and building methods discussed. Excellent as a historical document.





STERICK BUILDING, MEMPHIS

Architect: Wyatt C. Hedrick, Inc., Fort Worth, Texas.
Contractors: Bellows-Maclay Construction Company, Dallas, Texas.

2464 Corbin *Unit Locks* as used in corridor doors of Sterick Building, Memphis—tallest building in the South. *Trinity* design escutcheon bears letter "S", and this same letter appears on inside knobs. Finish, light statuary bronze. On the inside of the door plain bronze hardware used in light statuary bronze finish. The *Trinity* design letter drop is made especially for this building. Light statuary bronze finish with high lights polished.

No. 161½ Corbin cast iron butts are also used, polished and finished in light statuary bronze. Other Corbin items correspond in quality and finish.

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NEW BRITAIN, CONNECTICUT, U. S. A.
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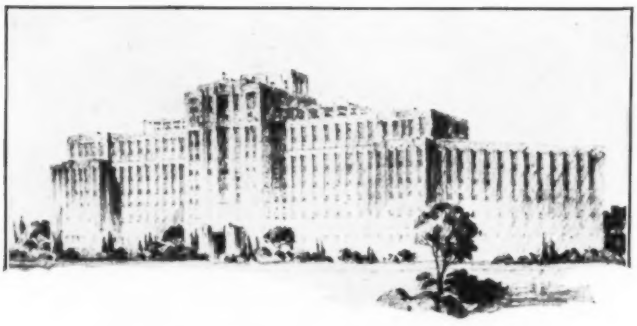

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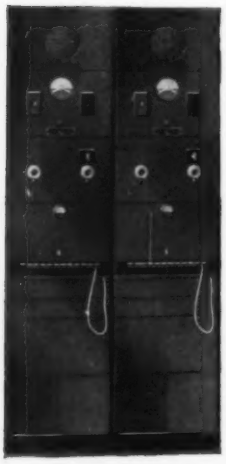

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NOTES IN BRIEF

FAMOUS ARCHITECTS?

Who are the ten greatest American architects? This question has been raised by President Ricketts of Rensselaer Polytechnic Institute and referred to THE ARCHITECTURAL RECORD. Appropriate candidates for the profession's honor roll are sought so that their names may be inscribed on the stone spandrels of a building which is being erected at Troy, N. Y., to house the school of architecture.

The suggestion that the names should be limited to American architects came from Prof. Joseph Hudnut, Columbia University, in response to an inquiry from President Ricketts. His letter is reprinted herewith:

Dear Mr. Ricketts:

I have talked over the selection of the names of great architects, referred to in your letter, with several members of our staff. They are greatly interested. It seems to me that you ought to confine your selection to architects of the Renaissance, because the names of the greatest architects before that time are for the most part unknown. My suggestion is:

Brunelleschi	Peruzzi
Palladio	LeNotre
Mansart	Jones
Bramante	Sanmichele
Michelangelo	Wren
Gabriel	McKim

If I were in your place I would confine my selection to American architects. I think that that would be a unique and interesting thing to do, and it seems proper that American architects should, for once, be honored. Besides this would have a certain "publicity value": everyone would ask who these men were and how they happened to be selected from among the mass of architects. You would have a "Hall of Fame," like New York University. That, in turn, would have a good effect upon the status of the architectural profession: people would be surprised to learn that architects were of enough importance to have their names carved upon stone on the facade of a building. Did you know that in the entire world there is only one monument erected to the memory of an architect? 300,000 generals, 400,000 politicians, one architect.

Here are the ten greatest American architects:

Bulfinch	Goodhue
Renwick	Mills
Burnham	Sullivan
Jefferson	La Trobe
Richardson	McKim

I have included only those who are dead (physically).

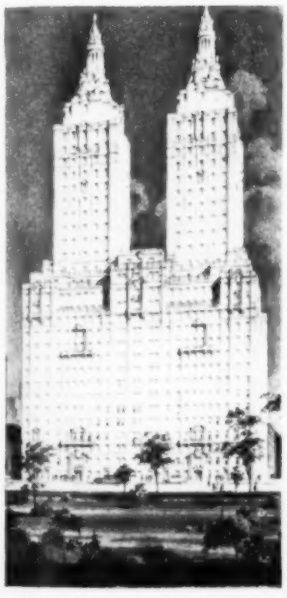
Yours very cordially,
Joseph Hudnut

Criticisms, and additions to this list of architects are requested by President Ricketts in order to

(*Continued on page 100*)

WHAT MADE THESE NEW YORK APARTMENT HOUSES EASIER TO RENT?...INCLUDE 11,076 KOHLER FIXTURES AND FITTINGS IN YOUR ANSWER

A bathroom with STANDISH *vitreous china lavatory and* VICEROY *tub each having Kohler Dynamic fittings.*



The San Remo, apartment at 74th and 75th Streets and Central Park West, New York City. Emery Roth, Architect. H. R. H. Construction Co., Builders. Sam Minskoff, Plumber. Dimock & Fink Company, Jobbers.

Beresford Apartment House, 81st and 82nd Streets and Central Park West, New York City. Emery Roth, Architect. H. R. H. Construction Co., Builders. Frank B. Lassette, Plumber. J. F. Keating Co., Jobbers.

Apartment at 12 West 81st Street, New York City. Emery Roth, Architect. H. R. H. Construction Co., Builders. Sam Minskoff, Plumber. Dimock & Fink Company, Jobbers.

IN NEW YORK or any other place, the bathroom is the most important room in the house. You know it. Home-hunters know it. They look at the bathroom first. They expect, rightly, clear pipes, efficient faucets and drains. They want tubs of good design; lavatories, closets and fittings soundly constructed and in correct taste. They ask for —and get—colors that are clear and uniform.

Architects recognize the trend. Generally, they follow the one wise practice: Specify the kind of fixtures and fittings that good taste, good business instruct. And in the best and finest places going up today—apartment houses never before equaled for size, luxury, and elegance of appointment—all-Kohler installations are increasingly evident. Here, for example, are three recent New York apartments, completely Kohler-equipped, with a total of 11,076 Kohler fixtures and fittings!

It's perfectly logical that all-Kohler installations should make any apartment house or a home easier to rent or sell—especially where competition is severe. If the bathroom and the kitchen are right, the whole place gets credit. High principles in plumbing are evidence of high principles at other critical points. Actual money savings add to the yearly dividends of satisfaction and security.

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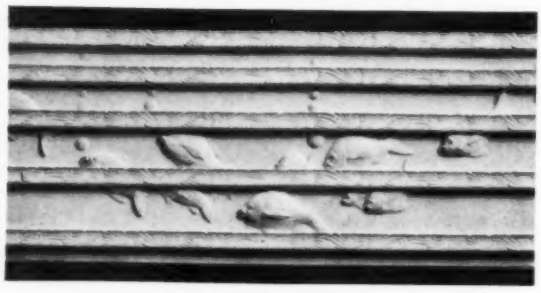
The new Jacobson Catalogue



MODERN DESIGN

For the last twelve months the designers and modelers of Jacobson & Company have been at work compiling the material for this new Catalogue. The new models pictured are the creation of our own designing staff, and have been selected for publication as being eminently usable in various types of buildings.

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NOTE: Models listed in former catalogues are always available.

determine the consensus of opinion in the architectural profession. Suggestions may be sent either to the editorial department of THE ARCHITECTURAL RECORD or to Prof. Ralph G. Gulley, dean, Rensselaer School of Architecture, Troy, New York.

ANNOUNCEMENTS

PHILIP H. JOHNSON, architect and engineer, announces the removal of his offices from the Widener Building to the twenty-second floor of the Architects Building, Seventeenth Street at Sansom, Philadelphia.

G. MASSERA AND A. V. DUPONT have recently arrived from France to practice architecture in this country. Their temporary address is Nemours, Wilmington, Delaware.

SAMUEL MARVIN SMITH, architect, announces the removal of his offices to 615 Shoreham Building, 15th and H Streets, N. W., Washington, D. C.

GEORGE R. CALLIS, JR., architect, announces the removal of his offices from the eighteenth and nineteenth floors of the Hearst Tower, Baltimore, to his new offices and studio at 13 Melvin Avenue, Catonsville, Maryland, and requests that manufacturers accordingly change their mailing lists.

ERNEST HOWARD YARDLEY, architect, 112 South 16th Street, Philadelphia, wishes to announce that he now has as associates J. Layng Mills of New York and Leon J. Meyung.

GEORGE BURDETT FORD

George Burdett Ford, architect and city planner, who died on August 15 was born in 1879 at Clinton, Mass. Mr. Ford was graduated from Harvard University in 1899 and afterward took up engineering and architecture at the Massachusetts Institute of Technology and at L'Ecole des Beaux Arts, Paris.

Notable in Mr. Ford's work was his service as consultant to the Committee on City Planning of the Board of Estimate and Apportionment of New York City and to the Commission on Building Districts and Restrictions. From his work on the latter commission emerged largely the present New York zoning and height regulations. Mr. Ford had been an advisor to the Regional Plan of New York and Its Environs since its inception and was one of a group of planners who made the preliminary study of the region and prepared maps dealing with land uses and means of traffic.

Among the cities he helped to plan were Trenton, Newark, Jersey City, Passaic, Elizabeth, Perth Amboy and East Orange, N. J.; Port Chester, New Rochelle, Mamaroneck, Ossining, Tarrytown, Scarsdale, Mount Kisco and Glen Cove, N. Y.; New Haven, Conn.; Springfield and Worcester, Mass.; Wilmington, Del.; Chester, Pa.; Cincinnati and Dayton, Ohio; Louisville and Lexington, Ky.; Richmond and Norfolk, Va., and Charleston, S. C.

(Continued on page 102)

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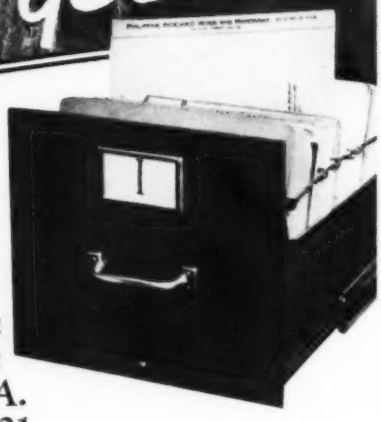

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FLAT ROOFS AND DOCTORS

"Although many of us have collaborated with doctors in the planning of hospitals, we have hardly realized yet the importance of their point of view in the arrangement of houses. Lens has a genuine complaint, for he speaks from a personal experience. He lives on the northern edge of St. John's Wood, in an oldish house with a pitched roof, except for one small part 13 ft. square, which has a flat roof. To the latter, access has been made, and for a few pounds Lens has acquired 'a new living room, a new toy, a sleeping place, a solarium and an observatory.' This experience leads him to the declaration, 'All these pitched roofs . . . represent stupid waste of . . . civic area.'

"We have much sympathy with the doctor's point of view. We will summarize the objections to it; as shortly as possible because to do so will seem to our modernist friends like crossing the *t* and dotting the *i* of obscurantism. A flat roof with a suitable surface for walking on, and protected by a parapet, is dearer than a pitched roof: an airspace between the ceiling and the roof gives insulation from heat in summer and cold in winter; it follows there is less risk of condensation; the tiles or slates covering a pitched roof are rather more reliable than the coverings of a flat roof; the elimination of pitched roofs will cause a wide dislocation of employment. But our main difficulty is with our clients, whom Lens would like us to persuade to his point of view. For our clients usually like sloping roofs, but entirely for sentimental reasons.

"Can we blame our clients for preferring the cheerfulness and assurance of pitched roofs to the dubious delights of sun-bathing with flies, or snoring to thunder; or for holding that any number of Bathshebas fail to banish the impression that German housing schemes look dull?

"But in so far as Lens considers there should be closer relations between his profession and ours, both our clients and ourselves agree. We are a nervous generation and health seems to us the prime necessity; just as the soldier moulded the buildings of the Middle Ages, and the gentleman those of the Renaissance, so the doctor's influence is predominant today. Every house-building client must be asked if he wants a solarium, either on the roof or as a recessed veranda or loggia, and even though we retain our slopes over the main blocks, we can form a flat roof in a subsidiary position and make the best of both worlds. . . ."

—From *The Architects' Journal*
August, 1930

A CORRECTION

In the TECHNICAL NEWS section of the September, 1930 issue, the captions under the Savarin Restaurant, Graybar Building, New York City and the Savarin Restaurant, New York Life Insurance Building, should have been credited to The John Van Range Company.

We wish to add that technical information was obtained from *Planning Restaurants That Make Money*, published by the John Van Range Company.